

**IN THE UNITED STATES DISTRICT COURT  
FOR THE WESTERN DISTRICT OF TEXAS  
WACO DIVISION**

**REDWOOD TECHNOLOGIES, LLC,**

**Plaintiff,**

**V.**

**BROADCOM, INC. AND BROADCOM CORPORATION,**

## Defendants.

## JURY TRIAL DEMANDED

**C.A. NO. 6:25-cv-2**

## **PLAINTIFF'S COMPLAINT FOR PATENT INFRINGEMENT**

Plaintiff Redwood Technologies, LLC (“Redwood”) files this Complaint against Defendants Broadcom, Inc. and Broadcom Corporation (collectively, “Broadcom” or “Defendants”) for infringement of U.S. Patent No. 7,664,130 (the “’130 patent”), U.S. Patent No. 7,917,102 (the “’102 patent”), U.S. Patent No. 7,688,901 (the “’901 patent”), U.S. Patent No. 7,974,371 (the “’371 patent”), U.S. Patent No. 8,155,224 (the “’224 patent”), U.S. Patent No. 8,744,005 (the “’005 patent”), U.S. Patent No. 8,873,517 (the “’517 patent”), and U.S. Patent No. 9,628,300 (the “’300 patent”), collectively, the “Asserted Patents.”

## THE PARTIES

1. Redwood Technologies, LLC is a Texas limited liability company, with a principal place of business at 812 West McDermott Dr. #1038, Allen, TX 75013.

2. On information and belief, Broadcom, Inc. a corporation organized under the laws of Delaware with a regular and established place of business at 6500 River Place Blvd., Austin, Texas 78730 (the “Broadcom Austin Office”). Broadcom, Inc. may be served through its registered agent for service: Corporation Service Company, located at 251 Little Falls Drive, Wilmington,

DE 19808. Broadcom, Inc. is a global infrastructure technology company providing Wi-Fi compliant devices. Broadcom, Inc. conducts business in Texas and within this District, directly or through intermediaries, including subsidiaries (e.g., Broadcom Corporation), distributors, affiliates, retailers, suppliers, integrators, customers, and others.

3. On information and belief, Broadcom Corporation is a California corporation with a regular and established place of business at the Broadcom Austin Office located at 6500 River Place Blvd., Austin, Texas 78730. Broadcom Corporation may be served through its registered agent for service: Corporation Service Company, 211 E. 7th Street Suite 620 Austin, Texas 78701. On information and belief, Broadcom Corporation is a wholly-owned and wholly-controlled subsidiary of Broadcom, Inc. Broadcom Corporation provides Wi-Fi compliant devices. Broadcom Corporation conducts business in Texas and within this District, directly or through intermediaries, including subsidiaries, distributors, affiliates, retailers, suppliers, integrators, customers, and others.

4. Defendants are engaged (including, as relevant, in the past) in making, using, selling, offering for sale, and/or importing, and/or inducing one another and their respective subsidiaries, affiliates, distributors, suppliers, retail partners, and customers in the making, using, selling, offering for sale, and/or importing throughout the United States, including within this District, the following products accused of infringement (the “Accused Products”):

- Broadcom devices that are compliant with IEEE 802.11n and/or IEEE 802.11ac and/or IEEE 802.11ax and/or IEEE 802.11be and/or Broadcom’s mesh devices that are compliant with IEEE 802.11 as well as their components (e.g., hardware, software, and/or firmware), and processes related to the same (collectively, “Broadcom Wi-Fi compliant devices”); and

- Products comprising Broadcom Wi-Fi compliant devices.

5. On information and belief, Broadcom, Inc. controls (and has controlled) Broadcom Corporation, as well as many other subsidiaries. On information and belief, Broadcom Corporation provides (and has provided) sales, distribution, research, and/or development support in the United States for its parent Broadcom, Inc., which owns Broadcom Corporation. Broadcom Corporation is, and has been, an agent of Broadcom, Inc. At the direction and control of Broadcom, Inc., its subsidiaries, including Broadcom Corporation, and/or other U.S.-based sales and/or distribution subsidiaries have made, used, sold, offered for sale, and/or imported and continue to make, use, sell, offer for sale, and/or import Accused Products in the United States and this District.

6. On information and belief Broadcom, Inc. controls (and has controlled) Broadcom Corporation. On information and belief, Broadcom Corporation and other Broadcom companies are, and have been, agents of Broadcom, Inc. For example, Broadcom, Inc. and Broadcom Corporation use the same name, logo, and trademark, further emphasizing that these companies are alter egos and/or agents of one another.

7. On information and belief, Broadcom, Inc. and Broadcom Corporation, along with their respective foreign and U.S.-based subsidiaries, affiliates, distributors, retail partners, and customers (which act as part of a global network and supply chain of overseas sales and manufacturing subsidiaries), have operated as agents of one another and vicariously as parts of the same business group to work in concert together and enter into agreements that are nearer than arm's length to provide (and have provided) a distribution channel of infringing products within this District and the U.S. nationally.

8. Broadcom, Inc. and Broadcom Corporation operate (and have operated) in agency with one another and their respective foreign and U.S.-based subsidiaries, affiliates, distributors,

retail partners, suppliers, and customers, to provide a distribution channel of infringing products within this District and the U.S. nationally. Broadcom, Inc. and Broadcom Corporation, individually and/or between one another and their respective agents and foreign and U.S.-based subsidiaries, affiliates, distributors, retail partners, suppliers, and customers, purposefully direct (and have directed) the Accused Products into established distribution channels within this District and the U.S. nationally.

9. On information and belief, Broadcom, Inc. and Broadcom Corporation, including their respective U.S.-based subsidiaries, affiliates, distributors, retail partners, and customers (which act as part of a global network and supply chain of overseas sales and manufacturing subsidiaries), have operated as agents of one another and vicariously as parts of the same business group to work in concert together and enter into agreements that are nearer than arm's length. Broadcom, Inc. and Broadcom Corporation, and their U.S.-based sales subsidiaries, individually and/or in concert, conduct business (and have conducted business) in the United States, including importing, using, testing, distributing, offering to sell, and selling the Accused Products that incorporate devices, systems, and processes that infringed the Asserted Patents in Texas and this District. *See Trois v. Apple Tree Auction Center, Inc.*, 882 F.3d 485, 490 (5th Cir. 2018) (“A defendant may be subject to personal jurisdiction because of the activities of its agent within the forum state....”); *see also Cephalon, Inc. v. Watson Pharmaceuticals, Inc.*, 629 F. Supp. 2d 338, 348 (D. Del. 2009) (“The agency theory may be applied not only to parents and subsidiaries, but also to companies that are ‘two arms of the same business group,’ operate in concert with each other, and enter into agreements with each other that are nearer than arm's length.”).

10. Through offers to sell, sales, imports, distributions, and other related agreements to transfer ownership of Defendants' Accused Products by and/or to affiliates, distributors,

subsidiaries, suppliers, retail partners, customers, agents, and/or other Defendants, Defendants are operating in (and have operated in) and maintaining (and maintained) a significant business presence in the U.S. and/or through their U.S. subsidiaries or agents, Defendants do business in the U.S., the state of Texas, and in this District.

11. Broadcom, Inc. and Broadcom Corporation are companies which together are “a global technology leader that designs, develops and supplies a broad range of semiconductor and infrastructure software solutions.” *See* <https://investors.broadcom.com/static-files/64f3ce85-082a-4bf5-9f1f-891931a648e8> at page 55. According to Broadcom, Inc.’s 2023 10-K, “references to ‘Broadcom,’ ‘we,’ ‘our,’ and ‘us’ mean Broadcom and its consolidated subsidiaries...” *Id.*

12. Broadcom, Inc. and Broadcom Corporation share the same management, common ownership, advertising platforms, facilities, distribution chains and platforms, and infringing product lines and products involving related technologies. On information and belief, Defendants operate as a single business entity and/or in concert with each other to manufacture, sell, offer to sell, import, market, advertise, and/or otherwise promote the Accused Products in the United States, including in the State of Texas generally and this District in particular. On information and belief, Defendants share directors, executives, and employees.

13. Broadcom, Inc., as a single enterprise of multiple operating subsidiaries acting in consort with one another, has a common Board of Directors. The collective set of Broadcom entities, including Defendants, is managed, in consort, by a common management team to direct the manufacture, distribution, and sale of Broadcom products, including the Accused Products.

14. Broadcom Corporation is a wholly-owned subsidiary of Broadcom, Inc. and engages in sales, advertising, marketing, and/or research in the United States on behalf of, and under the control of Broadcom, Inc.

15. The Broadcom Corporation and Broadcom, Inc. own, manage, and/or operate a highly interactive website at [www.broadcom.com](http://www.broadcom.com). Broadcom Corporation is the registrant of the [www.broadcom.com](http://www.broadcom.com) website, which advertises and offers for sale the Accused Products within this District. *See* <https://www.broadcom.com/how-to-buy>. (“Customers who have Direct Purchasing Agreements with Broadcom must register to order online.”) The privacy agreement for the Broadcom website is provided by at least Broadcom, Inc. and Broadcom Corporation. *See* <https://www.broadcom.com/company/legal/privacy/policy> (“Broadcom, Inc. and its global affiliates and subsidiaries (collectively, “Broadcom”) value your privacy. This Privacy Notice (“Notice”) describes how Broadcom collects, stores, uses, and discloses your Personal Data. ... Broadcom Inc., Broadcom Corporation, Avago Technologies US Inc. and CA, Inc. are participating in the Data Privacy Framework (“DPF”) Program. As part of Broadcom’s participation in the Data Privacy Framework, if you have an inquiry or complaint regarding Broadcom’s privacy practices in relation to Broadcom’s DPF certification, Broadcom encourages you to first contact Broadcom at [data.privacy \(at\) broadcom.com](mailto:data.privacy@broadcom.com). In cases of onward transfers to third parties, Broadcom remains liable to you.”). A link to this Privacy Statement is included on all webpages of the [www.broadcom.com](http://www.broadcom.com) website.

16. On information and belief, Broadcom, Inc. and Broadcom Corporation employ numerous employees in Austin, TX at the Broadcom Austin Office, where such employees possess information relevant to issues involving the Accused Products. For example, over 870 employees of Defendants are located in the Austin, TX metropolitan area. <https://www.linkedin.com/company/broadcom/people/?facetGeoRegion=900000064>. The Broadcom employees located in Austin, TX identify their employer as Broadcom or Broadcom, Inc. *See, e.g.,* <https://www.linkedin.com/in/cameronbenitt/>; <https://www.linkedin.com/in/june->

hee-lee-461315103/. Individuals working at the Broadcom Austin Office consider Broadcom, Inc. and/or Broadcom Corporation their employers.

17. On information and belief, the Broadcom Austin Office operates under the Broadcom trademark owned and controlled by Broadcom, Inc. and/or Broadcom Corporation:



18. On information and belief, employees of Broadcom, Inc. and Broadcom Corporation work at the Broadcom Austin Office. One or more of these employees perform services for Broadcom, Inc. and Broadcom Corporation, and Broadcom, Inc. and Broadcom Corporation can control what will be done and how it will be done.

19. On information and belief, Broadcom, Inc. and/or Broadcom Corporation provides benefits, such as its Employee Stock Purchase Plan (ESPP), to the employees working at the Broadcom Austin Office. The ESPP allows Broadcom employees the opportunity to purchase its stock at a discount.

20. On information and belief, Broadcom, Inc. and Broadcom Corporation have control over job postings for the Broadcom Austin Office, and Broadcom, Inc. and Broadcom Corporation advertise jobs located at the Broadcom Austin Office. *See, e.g.,*

[https://broadcom.wd1.myworkdayjobs.com/en-US/External\\_Career/details/Services---Lifecycle-Support-Engineer\\_R020116?locations=877d747df71910021366662e2df00000](https://broadcom.wd1.myworkdayjobs.com/en-US/External_Career/details/Services---Lifecycle-Support-Engineer_R020116?locations=877d747df71910021366662e2df00000) (“Broadcom is seeking a master Services & Lifecycle Support Engineer ...”).

21. On information and belief, agents of Broadcom, Inc. and Broadcom Corporation work at the Broadcom Austin Office. On information and belief, Broadcom, Inc. and Broadcom Corporation have control over the individuals working at the Broadcom Austin Office. Broadcom, Inc. and Broadcom Corporation control how individuals perform their job responsibilities.

22. On information and belief, Broadcom, Inc. and Broadcom Corporation issued orders requiring that the individuals assigned to the Broadcom Austin Office return to the office. As part of this mandate, Broadcom, Inc. and Broadcom Corporation also implemented connect@BRCM which they deployed globally. On information and belief, each person working at the Broadcom Austin Office was and is required to use the connect@BRCM application throughout their workday to provide benefits such as contact tracing. The connect@BRCM application used this information to instruct individuals working at Broadcom facilities to quarantine. See <https://www2.deloitte.com/content/dam/Deloitte/us/Documents/process-and-operations/us-acovid-success-story-bringing-workers-safely-back-to-on-site-at-broadcom.pdf> at 2. In other words, the connect@BRCM application provides immediate moment-to-moment control over how and where the individuals working at the Broadcom Austin Office performed their job.

23. On information and belief, Broadcom, Inc. and/or Broadcom Corporation also control the individuals working at the Broadcom Austin Office by making them adhere to its Code of Ethics and Business Conduct (the “Code”). Broadcom’s Code applies to “each of its subsidiaries” and all associated “employees.”



<https://investors.broadcom.com/staticfiles/3fae5e73-6bcd-438d-83cc-29d62c01830d>,

Broadcom's Code of Ethics and Business Conduct, p. 4. Broadcom, Inc. and/or Broadcom Corporation require all such entities and individuals to "abide by the requirements set forth in this Code." *Id.* And Broadcom, Inc. and Broadcom Corporation have the right to audit compliance with the Code discipline for non-compliance with the Code, including reprimands and termination. *Id.* at 6. In other words, Broadcom, Inc. and Broadcom Corporation have the right to interrupt day-to-day operations to ensure compliance with its Code.

24. On information and belief, Broadcom, Inc. and/or Broadcom Corporation also control the individuals working at the Broadcom Austin Office by providing a common email domain administered by Broadcom, Inc. and/or Broadcom Corporation. On information and belief, all individuals working at the Broadcom Austin Office are given a @broadcom.com email address. This common domain provides Broadcom, Inc. and Broadcom Corporation with control over access to email for the individuals working at the Broadcom Austin Office, as well as who they are allowed to communicate with. Broadcom, Inc. and Broadcom Corporation also control the equipment the individuals working at the Broadcom Austin Office use to perform their job functions.

25. On information and belief, Broadcom, Inc. and Broadcom Corporation consent to the individuals working at the Broadcom Austin Office acting as its agent. For example, Broadcom, Inc. and Broadcom Corporation give a @broadcom.com email address to the individuals working at the Broadcom Austin Office. Moreover, Broadcom, Inc. and Broadcom Corporation publish job openings for the Austin office, which indicates their relationship to the position.

26. On information and belief, Broadcom, Inc. and Broadcom Corporation also consent to the individuals working at the Broadcom Austin Office acting as their agent by allowing such individuals to use their name, corporate logo, and trademark in the course of their jobs.

27. On information and belief, Broadcom, Inc. and Broadcom Corporation also consent to the individuals working at the Broadcom Austin Office acting as its agent by allowing such individuals to identify it as their employer.

28. On information and belief, Broadcom, Inc. also consents to the individuals working at the Broadcom Austin Office acting as its agent by having its executives characterize the individuals working at the Austin office as “employees” when discussing them in interviews. *See* <https://www2.deloitte.com/content/dam/Deloitte/us/Documents/process-and-operations/us-acovid-success-story-bringing-workers-safely-back-to-on-site-at-broadcom.pdf>, Interview with the Head of Enterprise End-user Services & Experience at Broadcom Inc., at 3 (describing the process of designing the connect@BRCM application and stating, “the app interface has to be so simple that we don’t have to teach every single employee to use it, right, because you are talking about a global workforce across many countries, over 16,000 employees.”). By characterizing the connect@BRCM application as a solution for its employees, Broadcom, Inc. consents to the agency of such individuals. This is particularly true, in light of the fact that Broadcom, Inc. requires such individuals to work in an office displaying Broadcom’s trademark, use an @broadcom.com email address, and be listed in its Employee Directory.

29. Furthermore, subsidiaries of Broadcom, Inc, including Broadcom Corporation, operate at the Broadcom Austin Office. Each of these subsidiaries is an agent of Broadcom, Inc. and/or Broadcom Corporation. On information and belief, Broadcom, Inc. and/or Broadcom Corporation have control over the entities operating at the Broadcom Austin Office. On

information and belief, Broadcom comprises 22 divisions. These divisions include Payment Security, PreAmp Components, Identity Management Security, Wireless Communications and Connectivity, Symantec Enterprise, Emulex Connectivity, Motion Control Products, Physical Layer Products, Optoelectronic Products, Wireless Semiconductor, Mainframe Software, Agile Operations, Optical Systems, Broadband Video Group, ASIC Products, Brocade Storage Networking, Isolation Products, Intellectual Property and Licensing, Data Center Solutions Group, Switch Products (sometimes referred to as the Core Switching Group), Mixed Signal ASICs, and Industrial Fiber Products. *See* Broadcom Inc. Company Overview at p. 15, available at <https://investors.broadcom.com/static-files/93d4483d-25cf-4c36-ac86-9cd33f9b07ee>. These divisions provide the goods and services that Broadcom, Inc. and Broadcom Corporation offers.

30. Further, Broadcom, Inc. and/or Broadcom Corporation have control over access to the products and services that the entities operating at the Broadcom Austin Office purportedly provide. For example, Broadcom, Inc. and/or Broadcom Corporation can instruct CA, Inc. to suspend service to a customer in the event that the customer owes money to Broadcom on a completely unrelated agreement. <https://techdocs.broadcom.com/content/dam/broadcom/techdocs/us/en/pdf/ca-enterprise-software/intelligent-automation/ca-plex/plex730/ca-plex-7-3-0-source.pdf> at 35.

31. On information and belief, Broadcom, Inc. and/or Broadcom Corporation control the use of the Broadcom trademarks by the entities operating at the Broadcom Austin Office. Consequently, the use of the marks by the entities at the Broadcom Austin Office is done subject to the control of Broadcom, Inc. and/or Broadcom Corporation.

32. On information and belief, Broadcom, Inc. and/or Broadcom Corporation consent to the entities operating at the Broadcom Austin Office acting as its agent. For example, Broadcom,

Inc. tasks its subsidiaries with conducting the business of its divisions. *See e.g.*, Broadcom Inc. Company Overview at p. 15, available at <https://investors.broadcom.com/static-files/93d4483d-25cf-4c36-ac86-9cd33f9b07ee>. Further, Broadcom, Inc. and/or Broadcom Corporation consent to the entities at the Broadcom Austin Office operating under its trademark.

33. Additionally, on information and belief, Broadcom, Inc. and/or Broadcom Corporation consent to the entities operating at the Broadcom Austin Office acting as its agent by sharing a website with such entities.

34. On information and belief, Broadcom, Inc. and/or Broadcom Corporation also consent to the entities operating at the Broadcom Austin Office acting as its agent by listing workers for such entities in its Employee Directory. Similarly, Broadcom, Inc. and/or Broadcom Corporation consent to the agency relationship by listing the Broadcom Austin Office on its website under the “Contact Us” page. <https://www.broadcom.com/company/contact/locations>.

35. On information and belief, the entities operating at the Broadcom Austin Office consent to acting as the agent of Broadcom, Inc. and/or Broadcom Corporation. For example, the entities operating at the Broadcom Austin Office operate under the trademark and display signage of Broadcom, Inc. and Broadcom Corporation. This signage demonstrates consent to the agency relationship as it is intended to cause observers to associate the Broadcom Austin Office with Broadcom, Inc. and/or Broadcom Corporation.

36. Additionally, on information and belief, the entities operating at the Broadcom Austin Office consent to being an agent of Broadcom, Inc. and/or Broadcom Corporation by sharing a website with Broadcom, Inc. and/or Broadcom Corporation.

37. Broadcom, Inc. and/or Broadcom Corporation’s statements, conduct, and knowledge regarding the Broadcom Austin Office and the entities and individuals working there

create ostensible or apparent agency. On information and belief, Broadcom, Inc. and/or Broadcom Corporation permit the entities and individuals working at the Broadcom Austin Office to use its trade name and trademark. Moreover, Broadcom, Inc. and/or Broadcom Corporation policy the use of these marks by unauthorized entities. This authorized usage of the Broadcom trademark and trade name at the Broadcom Austin Office creates the impression that the office is operated by Broadcom, Inc. and/or Broadcom Corporation.

38. On information and belief, Broadcom, Inc. and Broadcom Corporation further the impression that they, individually or in concert, operate the Broadcom Austin Office by listing numerous Broadcom job postings for that office. Broadcom, Inc. and/or Broadcom Corporation's listing of the individuals working at the Broadcom Austin Office in its "Employee Directory" also lends to this ostensible agency. The repeated use of the Broadcom name and the utter lack of any other corporate name on the exterior of the Broadcom Austin Office creates an impression of agency in the public, including Plaintiff.

39. On information and belief, the Broadcom Austin Office is a place of Broadcom, Inc. and Broadcom Corporation. Broadcom, Inc. and Broadcom Corporation established and/or ratified the Broadcom Austin Office through its actions. For example, Broadcom, Inc. and Broadcom Corporation list the Broadcom Austin Office as a location on its website. Similarly, Broadcom's Employee Directory lists employees who work at the Broadcom Austin Office. And signs at the Broadcom Austin Office display Broadcom, Inc. and Broadcom Corporation's name and trademark.

40. On information and belief, Broadcom, Inc. and Broadcom Corporation control the Broadcom Austin Office. Broadcom, Inc. and Broadcom Corporation have control over the entities and employees that use the Broadcom Austin Office. On information and belief, Broadcom, Inc.

and Broadcom Corporation control the use of the Broadcom Austin Office. On information and belief, Broadcom employees and agents work at the Broadcom Austin Office on behalf of Broadcom, Inc. and/or Broadcom Corporation. On information and belief, Broadcom, Inc. and/or Broadcom Corporation exercise control over the Broadcom Austin Office by restricting access to the office. For example, Broadcom, Inc. and/or Broadcom Corporation require use of its connect@BRCM application and a security badge.

41. On information and belief, Broadcom, Inc. and/or Broadcom Corporation require workers at the Broadcom Austin Office to work at the office. For example, Broadcom, Inc. and/or Broadcom Corporation issued a policy requiring the workers at the Broadcom Austin Office to work at the office. *See, e.g.*, <https://www.mercurynews.com/2020/04/23/coronavirus-broadcom-said-to-be-bringing-employees-back-to-work-on-april-27/>.

42. On information and belief, one or more of the entities operating at the Broadcom Austin Office are alter egos of Broadcom, Inc. and/or Broadcom Corporation. On information and belief, the entities operating at the Broadcom Austin Office lack distinct and adequate capitalization. On information and belief, Broadcom, Inc. and/or Broadcom Corporation do not maintain separate daily operations with the entities operating at the Broadcom Austin Office. On information and belief, Broadcom, Inc. and/or Broadcom Corporation is involved in the daily operations of the entities operating at the Broadcom Austin Office. On information and belief, no barriers exist between management of Broadcom, Inc. and/or Broadcom Corporation and the entities operating at the Broadcom Austin Office. On information and belief, Broadcom, Inc. and/or Broadcom Corporation do not apprise others of the alleged separateness between themselves and the entities operating at the Broadcom Austin Office. On information and belief, Broadcom, Inc. and/or Broadcom Corporation finance the entities operating at the Broadcom

Austin Office. On information and belief, Broadcom, Inc. and/or Broadcom Corporation share common accounting with the entities operating at the Broadcom Austin Office. On information and belief, Broadcom, Inc. and/or Broadcom Corporation share common business units with the entities operating at the Broadcom Austin Office. On information and belief, Broadcom, Inc. and Broadcom Corporation's officers and directors can and do set policies for the entities operating at the Broadcom Austin Office. On information and belief, Broadcom, Inc. and/or Broadcom Corporation and the entities operating at the Broadcom Austin Office do not hold separate shareholder meetings. On information and belief, Broadcom, Inc. and/or Broadcom Corporation and the entities operating at the Broadcom Austin Office file consolidated financial statements. On information and belief, Broadcom, Inc. and/or Broadcom Corporation use the property of the entities operating at the Broadcom Austin Office as its own. And Broadcom, Inc., Broadcom Corporation, and the entities at the Broadcom Austin Office operate under a single trade name: Broadcom:



43. Prior to the filing of the Complaint, Redwood sent a letter on November 3, 2021 received by Broadcom, where Redwood attempted to engage Broadcom in licensing discussions

related to the Asserted Patents for reasonable and non-discriminatory terms for a license to be taken in the absence of litigation. Indeed, Broadcom has known about each of the Asserted Patents since at least November 2021, when Broadcom received notice of its infringement of the Asserted Patents via the letter sent by Redwood.

44. Prior to the filing of the Complaint, Redwood sent several follow-up letters to Broadcom, including letters sent on January 4, 2022 and March 2, 2022, where Redwood again attempted to engage Broadcom in licensing discussions related to the Asserted Patents for reasonable and non-discriminatory terms for a license to be taken in the absence of litigation. Indeed, Broadcom has known about each of the Asserted Patents since at least May 2022 when Broadcom received the second notice of its infringement of the Asserted Patents via a letter sent on May 12, 2022 where Redwood again attempted to engage Broadcom in licensing discussions related to the Asserted Patents for reasonable and non-discriminatory terms for a license to be taken in the absence of litigation. Redwood again sent a follow-up letter to Broadcom on September 13, 2022 and two follow-up letters to Broadcom on September 14, 2022, where Redwood once again attempted to engaged Broadcom in licensing discussions related to the Asserted Patents for reasonable and non-discriminatory terms for a license to be taken in the absence of litigation. On September 19, 2022, Broadcom finally replied to Redwood via e-mail, where Redwood provided Broadcom access to its data room for the infringement charts of the Asserted Patents.

45. To date, Broadcom has not agreed to license the Asserted Patents for reasonable and non-discriminatory terms. From October 14, 2022 to November 17, 2022, Redwood sent several follow-up emails to Broadcom offering to license the Asserted Patents to Broadcom for reasonable and non-discriminatory terms. Broadcom did not respond. On December 2, 2022,



Redwood emailed Broadcom notifying Broadcom that Redwood considered any RAND obligations to the IEEE fulfilled because of Broadcom's apparent refusal to engage in any licensing dialogue.

46. Furthermore, as a member of the relevant standards-setting bodies, on information and belief, Broadcom is on notice of standard essential patents issued to other members of the standards bodies.

47. Broadcom's past and continuing making, using, selling, offering for sale, and/or importing, and/or inducing subsidiaries, affiliates, retail partners, distributors, manufacturers of end user devices, customers, and other third parties in the making, using, selling, offering for sale, and/or importing the Accused Products throughout the United States i) willfully infringe each of the Asserted Patents and ii) impermissibly take the significant benefits of Redwood's patented technologies without fair compensation to Redwood.

48. Broadcom is engaged in making, using, testing, selling, offering for sale, and/or importing, and/or induces subsidiaries, affiliates, retail partners, distributors, manufacturers of end user devices, customers, and other third parties in the making, using, selling, offering for sale, and/or importing throughout the United States, including within this District, the Accused Products, such as Wi-Fi compliant components as well as access points, mobile devices, automobiles, IoT devices and other products that include Broadcom's Wi-Fi compliant components, accused of infringement.

49. On information and belief, Broadcom Inc. and Broadcom Corporation operate as a unitary business venture and are jointly and severally liable for the acts of patent infringement alleged herein.

**JURISDICTION AND VENUE**

50. Plaintiff incorporates paragraphs 1 through 49 herein by reference.

51. This action arises under the patent laws of the United States, namely 35 U.S.C. §§ 271, 281, and 284-285, among others.

52. This Court has subject matter jurisdiction pursuant to 28 U.S.C. §§ 1331 and 1338(a).

53. This Court has personal jurisdiction over Broadcom, Inc. and Broadcom Corporation in accordance with due process and/or the Texas Long Arm Statute because, among other things, Broadcom, Inc. and Broadcom Corporation do business in this State by, among other things, maintaining offices in this District, including maintaining its offices located at 6500 River Place Blvd., Austin, Texas 78730.

54. Further, this Court has personal jurisdiction over Broadcom, Inc. and Broadcom Corporation because each has engaged, and continues to engage, in continuous, systematic, and substantial activities within this State, including the substantial marketing, making, using, and sale of products and services within this State and this District. Indeed, this Court has personal jurisdiction over Broadcom, Inc. and Broadcom Corporation because each has committed acts giving rise to Redwood's claims for patent infringement within and directed to this District, has derived substantial revenue from its goods and services provided to individuals in this State and this District, and maintains regular and established places of business in this District, including their places of business at 6500 River Place Blvd., Austin, Texas 78730.

55. Relative to patent infringement, Broadcom, Inc. and Broadcom Corporation have committed and continue to commit acts in violation of 35 U.S.C. § 271, and have made, used, marketed, distributed, offered for sale, imported, and/or sold infringing products in this State,

including in this District, and otherwise engaged in infringing conduct within and directed at, or from, this District. Such products have been and continue to be offered for sale, distributed to, sold, and used in this District, and the infringing conduct has caused, and continues to cause, injury to Redwood, including injury suffered within this District. These are purposeful acts and transactions in this State and this District such that Broadcom, Inc. and Broadcom Corporation reasonably should know and expect that they could be hauled into this Court because of such activities.

56. In addition, Broadcom, Inc. and Broadcom Corporation have knowingly induced and continue to knowingly induce infringement within this District by advertising, marketing, offering for sale, and/or selling infringing devices within this District, to consumers, customers, manufacturers, distributors, resellers, partners, and/or end users, and providing instructions, user manuals, advertising, marketing materials, hardware, software, and/or firmware which facilitate, direct or encourage the use of infringing functionality with knowledge thereof.

57. Venue is proper in this District under 28 U.S.C. §§ 1391 and 1400(b) because Broadcom, Inc. and Broadcom Corporation have regular and established places of business in this District and have committed acts of infringement in this District. Broadcom, Inc. and Broadcom Corporation's regular and established places of business in this District include, at least, their offices at 6500 River Place Blvd., Austin, Texas 78730.

58. With respect to the '130 patent and the '517 patent, the Accused Products are devices that include, but are not limited to, Broadcom's devices and third party devices that comprise one or more of Broadcom's mesh devices that are compliant with IEEE 802.11 (*e.g.*, the BCM6715, BCM6726, BCM67263 series) as well as their components (*e.g.*, hardware, software, and/or firmware), and processes related to the same. With respect to the '102 patent, the Accused

Products are devices that include, but are not limited to, Broadcom's devices and third party devices that include one or more of Broadcom's devices that are compliant with IEEE 802.11n and/or IEEE 802.11ac and/or IEEE 802.11ax and/or 802.11be (*e.g.*, the BCM20130, BCM20138, BCM43012, BCM43013, BCM43162, BCM5356, BCM5356U, BCM5357, BCM43224, BCM4323, BCM4331, BCM43460, BCM43525, BCM4356, BCM4360, BCM4366, BCM43684, BCM43694, BCM43720, BCM43740, BCM4375, BCM43752, BCM4389, BCM4390, BCM4392, BCM4398, BCM47186, BCM47452, BCM47622, BCM47722, BCM5358, BCM5358U, BCM63167, BCM63168, BCM63178, BCM63268, BCM63269, BCM6361, BCM6362, BCM6710, BCM6715, BCM6726, BCM67263, BCM6750, BCM6752, BCM6753, BCM6755, BCM6756, BCM6757, BCM6765, BCM94361, BCM943698, BCM94375, BCM94391 series) as well as their components (*e.g.*, hardware, software, and/or firmware), and processes related to the same. With respect to the '901 patent, '371 patent, '224 patent, '005 patent, and '300 patent, the Accused Products are devices that include, but are not limited to, Broadcom's devices and third party devices that include one or more of Broadcom's devices that are compliant with IEEE 802.11n and/or IEEE 802.11ac and/or IEEE 802.11ax and/or IEEE 802.11be (*e.g.*, the BCM43224, BCM4323, BCM4331, BCM43460, BCM43525, BCM4356, BCM4360, BCM4366, BCM43684, BCM43694, BCM43720, BCM43740, BCM4375, BCM43752, BCM4389, BCM4390, BCM4392, BCM4398, BCM47186, BCM47452, BCM47622, BCM47722, BCM5358, BCM5358U, BCM63167, BCM63168, BCM63178, BCM63268, BCM63269, BCM6361, BCM6362, BCM6710, BCM6715, BCM6726, BCM67263, BCM6750, BCM6752, BCM6753, BCM6755, BCM6756, BCM6757, BCM6765, BCM94361, BCM943698,

BCM94375, BCM94391 series) as well as their components (*e.g.*, hardware, software, and/or firmware), and processes related to the same.<sup>1</sup>

**COUNT I**

(INFRINGEMENT OF U.S. PATENT NO. 7,664,130)

59. Plaintiff incorporates paragraphs 1 through 58 herein by reference.

60. Redwood is the assignee of the '130 patent, entitled "Wireless Communication System, Wireless Communication Apparatus, Wireless Communication Method, and Computer Program," with ownership of all substantial rights in the '130 patent, including the right to exclude others and to enforce, sue, and recover damages for past and future infringements.

61. The '130 patent is valid, enforceable, and was duly issued in full compliance with Title 35 of the United States Code. The '130 patent issued from U.S. Patent Application No. 11/066,482.

62. Broadcom has and continues to directly and/or indirectly infringe one or more claims of the '130 patent in this judicial district and elsewhere in Texas and the United States.

63. Broadcom directly infringes the '130 patent via 35 U.S.C. § 271(a) by making, using, offering for sale, selling, and/or importing the Accused Products, their components and processes, and/or products containing the same that incorporate the fundamental technologies covered by the '130 patent.

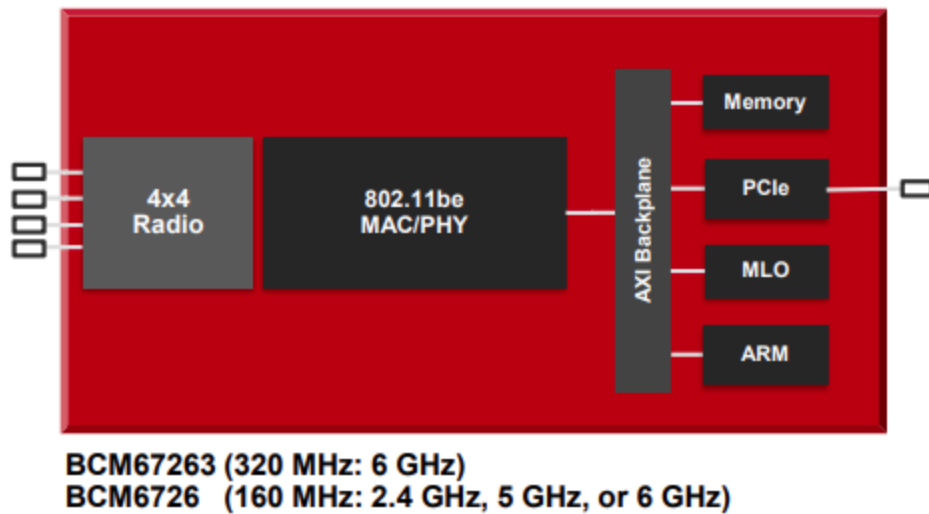
64. Furthermore, Broadcom, Inc. directly infringes the '130 patent through its direct involvement in the activities of its subsidiaries, including Broadcom Corporation. Such subsidiaries conduct activities that constitute direct infringement of the '130 patent under 35 U.S.C. § 271(a) by making, using, testing, offering for sale, selling, and/or importing those

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<sup>1</sup> Each of the relevant standards cited herein, and related to the Asserted Patents, are specifically incorporated into this Complaint.

Accused Products, their components and processes, and/or products containing the same that incorporated the fundamental technologies covered by the '130 patent. Further, Defendants are vicariously liable for this infringing conduct of its subsidiaries (under both the alter ego and agency theories) because, as an example and on information and belief, Broadcom, Inc, Broadcom Corporation, and their subsidiaries and related companies are essentially the same company, and Broadcom Inc. and Broadcom Corporation have the right and ability to control their subsidiaries infringing acts and receive a direct financial benefit from the infringement of its subsidiaries. Furthermore, on information and belief, Broadcom sells and makes the Accused Products outside of the United States, delivers those products to manufacturers, customers, distributors, and/or subsidiaries in the United States, or in the case that it delivers the Accused Products outside of the United States it does so intending and/or knowing that those products or products that are manufactured to include Broadcom's Accused Products are destined for the United States and/or designing those products for inclusion in other products to be placed on sale and used in the United States, thereby directly infringing the '130 patent. *See, e.g., Lake Cherokee Hard Drive Techs., L.L.C. v. Marvell Semiconductor, Inc.*, 964 F. Supp. 2d 653, 658 (E.D. Tex. 2013).

65. For example, Broadcom infringes claim 10 of the '130 patent via the Accused Products, including the BCM6726 series. The Accused Products, including the BCM6726 series, are mesh devices compliant with IEEE 802.11 and comprise a wireless communication station. *See, e.g.*, Fig. 19-2 of IEEE 802.11 2016; <https://www.broadcom.com/products/wireless/wireless-lan-infrastructure/bcm67263> (Broadcom advertising that the BCM6726 is MAC/PHY/radio device for Wi-Fi mesh); <https://docs.broadcom.com/doc/6726X-PB1XX>:



BCM67263 & BCM6726 Specifications	
Parameter	Details
Wi-Fi Standards	IEEE 802.11be (Wi-Fi 7) Release 1.0 compliant IEEE 802.11ax (Wi-Fi 6 & 6E) compliant IEEE 802.11 a/b/g/n/ac
Spatial Streams	Quad-stream 4x4
Spectral Bands	2.4 GHz 5 GHz 6 GHz

66. The Accused Products, including the BCM6726 series, each comprise a transmitter configured to transmit beacons with information associated with a network being described therein to other communication stations to construct a network. For example, the Accused Products, including the BCM6726 series, comprise a transmitter configured to transmit a beacon containing a Mesh Configuration element advertising the mesh services of a mesh network. *See, e.g.*, Sections 9.3.3.3, 9.4.2.98.1 and 14.13.3.31 of IEEE 802.11 2016.

67. The Accused Products, including the BCM6726 series, each comprise a receiver configured to receive timing information concerning priority transmission of a neighborhood communication station from said other communication stations. For example, the Accused Products comprise a receiver configured to receive a beacon that contains the Beacon Timing element, which comprises Beacon Timing Information fields that prioritize transmissions from

neighborhood communications to avoid Beacon frame collisions. *See, e.g.*, Sections 9.4.2.105, 14.13.4.2.6, and 14.13.4.3 and Figures 9-462 and 9-464 of IEEE 802.11 2016.

68. The Accused Products, including the BCM6726 series, each comprise a transmitter further configured to transmit a message to the neighborhood communication station, the message requesting a report of timing information concerning priority transmission of the neighborhood communication station. For example, the Accused Products, including the BCM6726 series, each comprise a transmitter further configured to transmit a Probe Request frame to request Beacon Timing Information concerning priority transmission of the neighborhood communication station. *See, e.g.*, Section 14.13.4.2.6 and Figure 9-464 of IEEE 802.11 2016.

69. The specific ways in which the Accused Products, including the BCM6726 series, are configured to support the aforementioned features of IEEE 802.11 2016 are further detailed in confidential documents and/or source code that evidence infringement by the Accused Products as to at least Claim 10 of the '130 patent.

70. Furthermore, the Accused Products, including the BCM6726 series, are configured or implemented in an infringing manner with the features and functionality recited in at least Claim 10 of the '130 patent.

71. The technology discussion above and the exemplary Accused Products provide context for Plaintiff's infringement allegations.

72. The claims of the '130 patent are patent eligible under 35 U.S.C. § 101. The '130 patent is not directed to an ineligible abstract idea. For example, it is not a mathematical algorithm executed on a generic computer or a fundamental economic business practice. Instead, it offers, for example, a technologically complex invention that "relates to a wireless communication system, a wireless communication apparatus, a wireless communication method and a computer



program, all enabling each communication station to evade mutual interference while performing communication securing a band by providing a prioritized utilization region.” ’130 patent, 1:35-41. The ’130 patent provides a technical solution to advance the goal above, for example, by describing that “each communication station can gather the transmission-reception dangerous zone by receiving the prioritized transmission frame from a neighboring station, and the system may be adapted so that each communication station informs the acquired information pertaining to the transmission-reception dangerous zone to the neighboring station. In such a case, when each communication station tries to perform a frame transmission, the communication station can prevent collisions previously by performing the frame transmission in the way of avoiding the transmission-reception dangerous zones recorded in the information signal received from the transmission destination.” ’130 patent, 14:30-41. That solution is reflected in independent claim 10 of the ’130 patent, which includes a limitation that recites “requesting a report of timing information concerning priority transmission of the neighborhood communication station.”

73. At a minimum, Broadcom, Inc. and Broadcom Corporation have known of the ’130 patent at least as early as the filing date of the Complaint. In addition, Broadcom, Inc. and Broadcom Corporation have known about the ’130 patent since at least November 2021, when Broadcom, Inc. and Broadcom Corporation received notice of the ’130 patent via a letter sent by Redwood on November 3, 2021. Redwood sent several follow-up letters to Broadcom, including letters sent on January 4, 2022 and March 2, 2022. In May 2022, Broadcom, Inc. and Broadcom Corporation received further notice of their infringement of the ’130 patent when Redwood sent a second letter providing notice of their infringement on May 12, 2022. Redwood again sent a follow-up letter to Broadcom, Inc. and Broadcom Corporation on September 13, 2022 and two follow-up letters to Broadcom, Inc. and Broadcom Corporation on September 14, 2022. On

September 19, 2022, Broadcom, Inc. and Broadcom Corporation finally replied to Redwood via e-mail, where Redwood provided Broadcom, Inc. and Broadcom Corporation access to its data room for the infringement chart of the '130 patent, where Broadcom, Inc. and Broadcom Corporation were provided further notice of their infringement. In addition, Broadcom Corporation has had knowledge of the '130 patent based at least on its conduct before the United States Patent and Trademark Office. For example, a related patent to the '130 patent was cited by the Examiner during the prosecution of the following patent documents assigned to Broadcom Corporation: U.S. Patent No. 7,987,499B2. Based on information and belief, Broadcom, Inc was on notice of the '130 patent from at least the foregoing dates that Broadcom Corporation was on notice of the '130 patent as a result of receiving actual or constructive notice from Broadcom Corporation, which is owned and controlled by its parent Broadcom, Inc.<sup>2</sup> Furthermore, Broadcom Corporation was on notice of the '130 patent from at least the foregoing dates that Broadcom, Inc. was on notice of the '130 patent as a result of receiving actual or constructive notice from Broadcom, Inc., which wholly owns and controls Broadcom Corporation, which is an agent and alter ego of Broadcom, Inc.<sup>3</sup>

74. On information and belief, since at least the above-mentioned dates when Broadcom was on notice of its infringement, Broadcom has actively induced, under U.S.C. § 271(b), distributors, customers, subsidiaries, importers, partners, affiliates, resellers, manufacturers, end users, and/or consumers to directly infringe one or more claims of the '130 patent by making, using, offering for sale, selling, and/or importing the Accused Products. Since

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<sup>2</sup> See e.g., *Nat'l Inst. for Strategic Tech. Acquisition & Commercialization v. Nissan of N. Am.*, No. 11-11039, 2012 U.S. Dist. LEXIS 117941, at \*14 (E.D. Mich. Aug. 21, 2012) ("It is also a reasonable inference that a Japanese parent company, Honda Motor Company, which received NISTAC's letter concerning the patents-in-suit, would communicate with its United States subsidiary, American Honda, about these patents and potential infringement thereof.").

<sup>3</sup> See FN 2, *supra*.

at least the notice provided on the above-mentioned dates, Broadcom does so with knowledge, or with willful blindness of the fact, that the induced acts constitute infringement of the '130 patent. Broadcom intends to cause, and has taken affirmative steps to induce infringement by distributors, customers, subsidiaries, importers, partners, affiliates, resellers, manufacturers, end users, and/or consumers by at least, inter alia, creating advertisements that promote the infringing use of the Accused Products, creating and/or maintaining and/or knowledge of established distribution channels for the Accused Products into and within the United States, manufacturing the Accused Products in conformity with U.S. laws and regulations, manufacturing the Accused Products in conformity with the relevant IEEE 802.11 standards, distributing or making available instructions or manuals for the Accused Products to purchasers and prospective buyers, providing the accused functionalities via hardware, software, and/or firmware that are included in the Accused Products to manufacturers, purchasers, sellers, distributors, and/or end users, testing and certifying features related to infringing features in the Accused Products, and/or providing technical support, replacement parts, or services for these products to these purchasers and/or sellers in the United States.

75. On information and belief, despite having knowledge of the '130 patent and their infringement, Defendants specifically intended for others to import and sell products accused of infringing the '130 patent. For example, Defendants specifically intended for its U.S.-based subsidiaries or customers to import and sell products accused of infringing the '130 patent. On information and belief, Defendants instructed and encouraged the importers to import and/or sell products accused of infringing the '130 patent. On information and belief, the purchase and sale agreements between Broadcom, Inc., Broadcom Corporation, and the importers provide such instruction and/or encouragement. Further, on information and belief, Defendants' U.S.-based

subsidiaries, affiliates, employees, agents, and/or related companies existed for inter alia, the purpose of importing and selling products accused of infringing the '130 patent in the United States.

76. On information and belief, since at least the above-mentioned dates when Broadcom was on notice of its infringement, Broadcom's contributory infringement pursuant to 35 U.S.C. § 271(c) includes offering to sell and/or license, selling and/or licensing, and/or providing within the United States, or importing into the United States, components of the patented invention of one or more claims of the '130 patent, constituting a material part of the invention. On information and belief, Broadcom knows and has known the same to be especially made or especially adapted for use in an infringement of the '130 patent by making the Accused Products in conformity with the relevant IEEE 802.11 standards, and such components are not a staple article or commodity of commerce suitable for substantial noninfringing use. For example, Broadcom offers to sell, sells, and/or licenses or otherwise provides hardware and/or software/firmware components of the Accused Products within the United States; the components constitute a material part of the claimed inventions of the '130 patent that are especially made or especially adapted for use in end user products that infringe the '130 patent; and the components are not a staple article or commodity of commerce suitable for substantial noninfringing use.

77. On information and belief, since at least the above-mentioned dates when Broadcom was on notice of its infringement, Broadcom's infringement pursuant to 35 U.S.C. § 271(f)(1) includes supplying or causing to be supplied in or from the United States all or a substantial portion of the components of the patented invention of one or more claims of the '130 patent, where such components are uncombined in whole or in part, in such manner as to actively induce the combination of such components outside of the United States in a manner that would

infringe the patent if such combination occurred within the United States. For example, Broadcom supplies or causes to be supplied in or from the United States the hardware and/or software/firmware components of the Accused Products that comprise all or a substantial portion of the components of the patented inventions of the '130 patent, where Broadcom actively induces the combination of such components outside of the United States in a manner that would infringe the patent if such combination occurred within the United States. In another example, Broadcom supplies or causes to be supplied in or from the United States the hardware and/or software/firmware components of the Accused Products that comprise all or a substantial portion of the components of the patented inventions of the '130 patent, where Broadcom actively induces the combination of the hardware and/or software/firmware components with other components of an end user device outside of the United States in a manner that would infringe the patent if such combination occurred within the United States. Broadcom intends to cause, and has taken affirmative steps to induce infringement by distributors, customers, subsidiaries, importers, partners, affiliates, resellers, manufacturers, and/or consumers by at least, inter alia, creating advertisements that promote the infringing use of the Accused Products, creating and/or maintaining and/or knowledge of established distribution channels for the Accused Products into and within the United States, manufacturing the components of the Accused Products in conformity with U.S. laws and regulations, manufacturing the components of the Accused Products in conformity with the relevant IEEE 802.11 standards, distributing or making available instructions or manuals or marketing materials regarding the combination of the hardware and software/firmware components, distributing or making available instructions or manuals or marketing materials regarding the combination of the hardware and/or software/firmware components with other components as part of making an end user device in part or in whole, testing

and certifying features related to infringing features in the Accused Products, providing software and/or firmware for the Accused Products to manufacturers, purchasers, sellers, distributors, and/or end users, and/or providing technical support, replacement parts, or services for these products to these purchasers and/or sellers in the United States.

78. On information and belief, since at least the above-mentioned dates when Broadcom was on notice of its infringement, Broadcom's infringement pursuant to 35 U.S.C. § 271(f)(2) includes supplying or causing to be supplied in or from the United States components of the patented invention of one or more claims of the '130 patent that are especially made or especially adapted for use in the invention and not staple articles or commodities of commerce suitable for substantial noninfringing use, where such components are uncombined in whole or in part, knowing that such components are so made or adapted and intending that such components will be combined outside of the United States in a manner that would infringe the patent if such combination occurred within the United States. For example, Broadcom supplies or causes to be supplied in or from the United States the hardware and/or software/firmware components that comprise all or a substantial portion of the components of the patented inventions of the '130 patent, where such components are uncombined in whole or in part, knowing that such components are especially made or especially adapted for use in the invention and not staple articles or commodities of commerce suitable for substantial noninfringing use and intending that such components will be combined outside of the United States in a manner that would infringe the patent if such combination occurred within the United States. In another example, Broadcom supplies or causes to be supplied in or from the United States the hardware and/or software/firmware components that comprise all or a substantial portion of the components of the patented inventions of the '130 patent, where such components are uncombined in whole or in part

with other components of an end user device, knowing that such components are especially made or especially adapted for use in the invention and not staple articles or commodities of commerce suitable for substantial noninfringing use and intending that such components will be combined with other components of an end user device outside of the United States in a manner that would infringe the patent if such combination occurred within the United States.

79. On information and belief, despite having knowledge of the '130 patent and knowledge that it is directly and/or indirectly infringing one or more claims of the '130 patent, Broadcom has nevertheless continued its infringing conduct and disregarded an objectively high likelihood of infringement. Broadcom's infringing activities relative to the '130 patent have been, and continue to be, willful, wanton, malicious, in bad-faith, deliberate, consciously wrongful, flagrant, characteristic of a pirate, and an egregious case of misconduct beyond typical infringement such that Plaintiff is entitled under 35 U.S.C. § 284 to enhanced damages up to three times the amount found or assessed.

80. Redwood has been damaged as a result of Broadcom's infringing conduct described in this Count. Broadcom is, thus, liable to Redwood in an amount that adequately compensates Redwood for Broadcom's infringements, which, by law, cannot be less than a reasonable royalty, together with interest and costs as fixed by this Court under 35 U.S.C. § 284.

## **COUNT II**

(INFRINGEMENT OF U.S. PATENT NO. 7,917,102)

81. Plaintiff incorporates paragraphs 1 through 80 herein by reference.

82. Redwood is the assignee of the '102 patent, entitled "Radio Transmitting Apparatus and Radio Transmission Method," with ownership of all substantial rights in the '102 patent, including the right to exclude others and to enforce, sue, and recover damages for past and future infringements.

83. The '102 patent is valid, enforceable, and was duly issued in full compliance with Title 35 of the United States Code. The '102 patent issued from U.S. Patent Application No. 11/937,422.

84. Broadcom has and continues to directly and/or indirectly infringe one or more claims of the '102 patent in this judicial district and elsewhere in Texas and the United States.

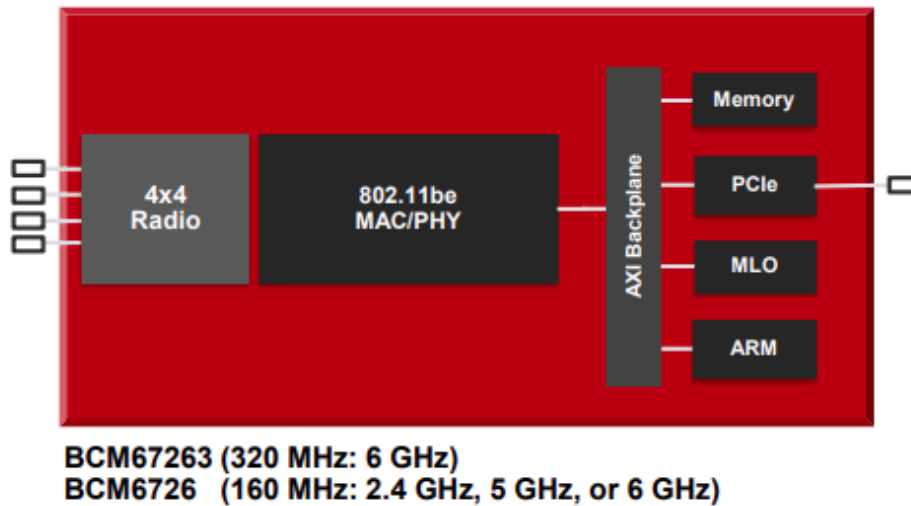
85. Broadcom directly infringes the '102 patent via 35 U.S.C. § 271(a) by making, using, offering for sale, selling, and/or importing the Accused Products, their components and processes, and/or products containing the same that incorporate the fundamental technologies covered by the '102 patent.

86. Furthermore, Broadcom, Inc. directly infringes the '102 patent through its direct involvement in the activities of its subsidiaries, including Broadcom Corporation. Such subsidiaries conduct activities that constitute direct infringement of the '102 patent under 35 U.S.C. § 271(a) by making, using, testing, offering for sale, selling, and/or importing those Accused Products, their components and processes, and/or products containing the same that incorporated the fundamental technologies covered by the '102 patent. Further, Defendants are vicariously liable for this infringing conduct of its subsidiaries (under both the alter ego and agency theories) because, as an example and on information and belief, Broadcom, Inc, Broadcom Corporation, and their subsidiaries and related companies are essentially the same company, and Broadcom Inc. and Broadcom Corporation have the right and ability to control their subsidiaries infringing acts and receive a direct financial benefit from the infringement of its subsidiaries. Furthermore, on information and belief, Broadcom sells and makes the Accused Products outside of the United States, delivers those products to manufacturers, customers, distributors, and/or subsidiaries in the United States, or in the case that it delivers the Accused Products outside of the



United States it does so intending and/or knowing that those products or products that are manufactured to include Broadcom's Accused Products are destined for the United States and/or designing those products for inclusion in other products to be placed on sale and used in the United States, thereby directly infringing the '102 patent. *See, e.g., Lake Cherokee Hard Drive Techs., L.L.C. v. Marvell Semiconductor, Inc.*, 964 F. Supp. 2d 653, 658 (E.D. Tex. 2013).

87. For example, Broadcom infringes claim 3 of the '102 patent via the Accused Products, including the BCM6726 series. The Accused Products, including the BCM6726 series, each are compliant with IEEE 802.11n and/or IEEE 802.11ac and/or IEEE 802.11ax, and/or IEEE 802.11be and each comprise a radio transmitting apparatus that transmits a modulated signal. <https://www.broadcom.com/products/wireless/wireless-lan-infrastructure/bcm67263> (Broadcom advertising that the BCM6726 is MAC/PHY/radio device); <https://docs.broadcom.com/doc/6726X-PB1XX>:



BCM67263 & BCM6726 Specifications	
Parameter	Details
Wi-Fi Standards	IEEE 802.11be (Wi-Fi 7) Release 1.0 compliant IEEE 802.11ax (Wi-Fi 6 & 6E) compliant IEEE 802.11 a/b/g/n/ac
Spatial Streams	Quad-stream 4x4
Spectral Bands	2.4 GHz 5 GHz 6 GHz

88. The Accused Products, including the BCM6726 series, each comprise circuitry and/or components (hardware and/or software) that forms a transmission frame which includes a frequency offset estimation signal for estimating frequency offset of the modulated signal at a receiving apparatus, a channel fluctuation estimation signal for estimating channel fluctuation of the modulated signal at the receiving apparatus and a gain control signal for performing gain control of the modulated signal at the receiving apparatus. The Accused Products, including the BCM6726 series, must be configured to form the claimed “transmission frame” for a HT-mixed format PPDU frame, which is a mandatory feature of IEEE 802.11 2016. *See, e.g.*, Figure 19-1 of IEEE 802.11 2016; [https://www.albany.edu/faculty/dsaha/teach/2019Spring\\_CEN574/slides/08\\_WLAN.pdf](https://www.albany.edu/faculty/dsaha/teach/2019Spring_CEN574/slides/08_WLAN.pdf) at slides 67-68 (the HT-mixed format PPDU is mandatory). For example, the Accused Products, including the BCM6726 series, each form a HT-mixed format PPDU frame, which comprises an L-LTF subframe, which is a frequency offset estimation signal. *See, e.g.*, Figures 17-4 and 19-1 of IEEE 802.11 2016. The HT-mixed format PPDU frame also comprises an HT-LTF subframe, which is a channel fluctuation estimation signal. *See, e.g.*, Figure 19-1 and Section 19.3.9.4.6 of IEEE 802.11 2016. The HT-mixed format PPDU frame also comprises an L-STF subframe, which is a gain control signal. *See, e.g.*, Figure 19-1 and Section 19.3.9.3.3 of IEEE 802.11 2016.

89. The Accused Products, including the BCM6726 series, each comprise circuitry and/or components (hardware and/or software) configured to transmit the transmission frame. For example, the Accused Products, including the BCM6726 series, must be configured to transmit a transmission frame for a HT-mixed format PPDU, which is a mandatory feature of IEEE 802.11 2016. *See, e.g.*, Figure 19-1 of IEEE 802.11 2016;

[https://www.albany.edu/faculty/dsaha/teach/2019Spring\\_CEN574/slides/08\\_WLAN.pdf](https://www.albany.edu/faculty/dsaha/teach/2019Spring_CEN574/slides/08_WLAN.pdf) at slides 67-68 (the HT-mixed format PPDU is mandatory).

90. The transmission frame includes a first gain control signal and a second gain control signal. For example, the HT-mixed format PPDU comprises a first gain control signal in the L-STF subframe and a second gain control signal in the HT-STF subframe. *See, e.g.*, Figure 19-1 and Sections 19.3.9.3.3 and 19.3.9.4.5 of IEEE 802.11 2016. The first gain control signal is arranged prior to the frequency offset estimation signal. For example, the L-STF subframe is arranged prior to the L-LTF subframe. *See, e.g.*, Figure 19-1 of IEEE 802.11 2016. The second gain control is arranged subsequent to the frequency offset estimation signal and prior to the channel fluctuation estimation signal. For example, the HT-STF subframe is arranged subsequent to the L-LTF subframe and prior to the HT-LTF subframe. *See, e.g.*, Figure 19-1 of IEEE 802.11 2016.

91. The specific ways in which the Accused Products, including the BCM6726 series, are configured to support the aforementioned features of IEEE 802.11n and/or 802.11ac and/or 802.11ax and/or IEEE 802.11be are further detailed in confidential documents and/or source code that evidence infringement by the Accused Products as to Claim 3 of the '102 patent.

92. Furthermore, the Accused Products, including the BCM6726 series, are configured or implemented in an infringing manner with the features and functionality recited in at least Claim 3 of the '102 patent.

93. The technology discussion above and the exemplary Accused Products provide context for Plaintiff's infringement allegations.

94. The claims of the '102 patent are patent eligible under 35 U.S.C. § 101. The '102 patent is not directed to an ineligible abstract idea. For example, it is not a mathematical algorithm

executed on a generic computer or a fundamental economic business practice. Instead, for example, it offers a technologically complex, particularized “radio transmitting apparatus and radio transmission method that enable[s] reception quality to be improved by reducing pilot symbol and data symbol quantization error in a system in which the number of simultaneously transmitted modulated signals is changed according to the propagation environment and so forth.” ’102 patent, 2:12-18. The ’102 patent provides the technical solution above, for example, by “changing the transmit power of the modulated signal transmitted from each antenna according to the number of antennas that simultaneously transmit modulated signals (that is, the number of modulated signals).” ’102 patent, 2:19-22. That solution is reflected in the claims 1, 3, 5, and 10 of the ’102 patent, which include, for example, gain control limitations that can be used in the changing of the transmit power of the modulated signals. *See, e.g.*, ’102 patent, 17:34-50.

95. At a minimum, Broadcom, Inc. and Broadcom Corporation have known of the ’102 patent at least as early as the filing date of the Complaint. In addition, Broadcom, Inc. and Broadcom Corporation have known about the ’102 patent since at least November 2021, when Broadcom, Inc. and Broadcom Corporation received notice of their infringement of the ’102 patent via a letter sent by Redwood on November 3, 2021. Redwood sent several follow-up letters to Broadcom, including letters sent on January 4, 2022 and March 2, 2022. In May 2022, Broadcom, Inc. and Broadcom Corporation received further notice of their infringement of the ’102 patent when Redwood sent a second letter providing notice of their infringement on May 12, 2022. Redwood again sent a follow-up letter to Broadcom, Inc. and Broadcom Corporation on September 13, 2022 and two follow-up letters to Broadcom, Inc. and Broadcom Corporation on September 14, 2022. On September 19, 2022, Broadcom, Inc. and Broadcom Corporation finally replied to Redwood via e-mail, where Redwood provided Broadcom, Inc. and Broadcom Corporation access

to its data room for the infringement chart of the '102 patent, where Broadcom, Inc. and Broadcom Corporation were provided further notice of their infringement. In addition, Broadcom Corporation has had knowledge of the '102 patent based at least on its conduct before the United States Patent and Trademark Office. For example, a related patent to the '102 patent was cited by the Examiner during the prosecution of the following patent documents assigned to Broadcom Corporation: U.S. Patent Application Publication No. US20070109955A1. Based on information and belief, Broadcom, Inc was on notice of the '102 patent from at least the foregoing dates that Broadcom Corporation was on notice of the '102 patent as a result of receiving actual or constructive notice from Broadcom Corporation, which is owned and controlled by its parent Broadcom, Inc.<sup>4</sup> Furthermore, Broadcom Corporation was on notice of the '102 patent from at least the foregoing dates that Broadcom, Inc. was on notice of the '102 patent as a result of receiving actual or constructive notice from Broadcom, Inc., which wholly owns and controls Broadcom Corporation, which is an agent and alter ego of Broadcom, Inc.<sup>5</sup>

96. On information and belief, since at least the above-mentioned dates when Broadcom was on notice of its infringement, Broadcom has actively induced, under U.S.C. § 271(b), distributors, customers, subsidiaries, importers, partners, affiliates, resellers, manufacturers, end users, and/or consumers to directly infringe one or more claims of the '102 patent by making, using, offering for sale, selling, and/or importing the Accused Products. Since at least the notice provided on the above-mentioned dates, Broadcom does so with knowledge, or with willful blindness of the fact, that the induced acts constitute infringement of the '102 patent. Broadcom intends to cause, and has taken affirmative steps to induce infringement by distributors, customers, subsidiaries, importers, partners, affiliates, resellers, manufacturers, end users, and/or

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<sup>4</sup> See FN 2, *supra*.

<sup>5</sup> See FN 2, *supra*.

consumers by at least, inter alia, creating advertisements that promote the infringing use of the Accused Products, creating and/or maintaining and/or knowledge of established distribution channels for the Accused Products into and within the United States, manufacturing the Accused Products in conformity with U.S. laws and regulations, manufacturing the Accused Products in conformity with the relevant IEEE 802.11 standards, distributing or making available instructions or manuals for the Accused Products to purchasers and prospective buyers, providing the accused functionalities via hardware, software, and/or firmware that are included in the Accused Products to manufacturers, purchasers, sellers, distributors, and/or end users, testing and certifying features related to infringing features in the Accused Products, and/or providing technical support, replacement parts, or services for these products to these purchasers and/or sellers in the United States.

97. On information and belief, despite having knowledge of the '102 patent and their infringement, Defendants specifically intended for others to import and sell products accused of infringing the '102 patent. For example, Defendants specifically intended for its U.S.-based subsidiaries or customers to import and sell products accused of infringing the '102 patent. On information and belief, Defendants instructed and encouraged the importers to import and/or sell products accused of infringing the '102 patent. On information and belief, the purchase and sale agreements between Broadcom, Inc., Broadcom Corporation, and the importers provide such instruction and/or encouragement. Further, on information and belief, Defendants' U.S.-based subsidiaries, affiliates, employees, agents, and/or related companies existed for inter alia, the purpose of importing and selling products accused of infringing the '102 patent in the United States.

98. On information and belief, since at least the above-mentioned dates when Broadcom was on notice of its infringement, Broadcom's contributory infringement pursuant to 35 U.S.C. § 271(c) includes offering to sell and/or license, selling and/or licensing, and/or providing within the United States, or importing into the United States, components of the patented invention of one or more claims of the '102 patent, constituting a material part of the invention. On information and belief, Broadcom knows and has known the same to be especially made or especially adapted for use in an infringement of the '102 patent by making the Accused Products in conformity with the relevant IEEE 802.11 standards, and such components are not a staple article or commodity of commerce suitable for substantial noninfringing use. For example, Broadcom offers to sell, sells, and/or licenses or otherwise provides hardware and/or software/firmware components of the Accused Products within the United States; the components constitute a material part of the claimed inventions of the '102 patent that are especially made or especially adapted for use in end user products that infringe the '102 patent; and the components are not a staple article or commodity of commerce suitable for substantial noninfringing use.

99. On information and belief, since at least the above-mentioned dates when Broadcom was on notice of its infringement, Broadcom's infringement pursuant to 35 U.S.C. § 271(f)(1) includes supplying or causing to be supplied in or from the United States all or a substantial portion of the components of the patented invention of one or more claims of the '102 patent, where such components are uncombined in whole or in part, in such manner as to actively induce the combination of such components outside of the United States in a manner that would infringe the patent if such combination occurred within the United States. For example, Broadcom supplies or causes to be supplied in or from the United States the hardware and/or software/firmware components of the Accused Products that comprise all or a substantial portion

of the components of the patented inventions of the '102 patent, where Broadcom actively induces the combination of such components outside of the United States in a manner that would infringe the patent if such combination occurred within the United States. In another example, Broadcom supplies or causes to be supplied in or from the United States the hardware and/or software/firmware components of the Accused Products that comprise all or a substantial portion of the components of the patented inventions of the '102 patent, where Broadcom actively induces the combination of the hardware and/or software/firmware components with other components of an end user device outside of the United States in a manner that would infringe the patent if such combination occurred within the United States. Broadcom intends to cause, and has taken affirmative steps to induce infringement by distributors, customers, subsidiaries, importers, partners, affiliates, resellers, manufacturers, and/or consumers by at least, inter alia, creating advertisements that promote the infringing use of the Accused Products, creating and/or maintaining and/or knowledge of established distribution channels for the Accused Products into and within the United States, manufacturing the components of the Accused Products in conformity with U.S. laws and regulations, manufacturing the components of the Accused Products in conformity with the relevant IEEE 802.11 standards, distributing or making available instructions or manuals or marketing materials regarding the combination of the hardware and software/firmware components, distributing or making available instructions or manuals or marketing materials regarding the combination of the hardware and/or software/firmware components with other components as part of making an end user device in part or in whole, testing and certifying features related to infringing features in the Accused Products, providing software and/or firmware for the Accused Products to manufacturers, purchasers, sellers, distributors,



and/or end users, and/or providing technical support, replacement parts, or services for these products to these purchasers and/or sellers in the United States.

100. On information and belief, since at least the above-mentioned dates when Broadcom was on notice of its infringement, Broadcom's infringement pursuant to 35 U.S.C. § 271(f)(2) includes supplying or causing to be supplied in or from the United States components of the patented invention of one or more claims of the '102 patent that are especially made or especially adapted for use in the invention and not staple articles or commodities of commerce suitable for substantial noninfringing use, where such components are uncombined in whole or in part, knowing that such components are so made or adapted and intending that such components will be combined outside of the United States in a manner that would infringe the patent if such combination occurred within the United States. For example, Broadcom supplies or causes to be supplied in or from the United States the hardware and/or software/firmware components that comprise all or a substantial portion of the components of the patented inventions of the '102 patent, where such components are uncombined in whole or in part, knowing that such components are especially made or especially adapted for use in the invention and not staple articles or commodities of commerce suitable for substantial noninfringing use and intending that such components will be combined outside of the United States in a manner that would infringe the patent if such combination occurred within the United States. In another example, Broadcom supplies or causes to be supplied in or from the United States the hardware and/or software/firmware components that comprise all or a substantial portion of the components of the patented inventions of the '102 patent, where such components are uncombined in whole or in part with other components of an end user device, knowing that such components are especially made or especially adapted for use in the invention and not staple articles or commodities of commerce

suitable for substantial noninfringing use and intending that such components will be combined with other components of an end user device outside of the United States in a manner that would infringe the patent if such combination occurred within the United States.

101. On information and belief, despite having knowledge of the '102 patent and knowledge that it is directly and/or indirectly infringing one or more claims of the '102 patent, Broadcom has nevertheless continued its infringing conduct and disregarded an objectively high likelihood of infringement. Broadcom's infringing activities relative to the '102 patent have been, and continue to be, willful, wanton, malicious, in bad-faith, deliberate, consciously wrongful, flagrant, characteristic of a pirate, and an egregious case of misconduct beyond typical infringement such that Plaintiff is entitled under 35 U.S.C. § 284 to enhanced damages up to three times the amount found or assessed.

102. Redwood has been damaged as a result of Broadcom's infringing conduct described in this Count. Broadcom is, thus, liable to Redwood in an amount that adequately compensates Redwood for Broadcom's infringements, which, by law, cannot be less than a reasonable royalty, together with interest and costs as fixed by this Court under 35 U.S.C. § 284.

### **COUNT III**

(INFRINGEMENT OF U.S. PATENT NO. 7,688,901)

103. Plaintiff incorporates paragraphs 1 through 102 herein by reference.

104. Redwood is the assignee of the '901 patent, entitled "Transmission Method, Transmission Apparatus, and Reception Apparatus," with ownership of all substantial rights in the '901 patent, including the right to exclude others and to enforce, sue, and recover damages for past and future infringements.

105. The '901 patent is valid, enforceable, and was duly issued in full compliance with Title 35 of the United States Code. The '901 patent issued from U.S. Patent Application No. 10/486,895.

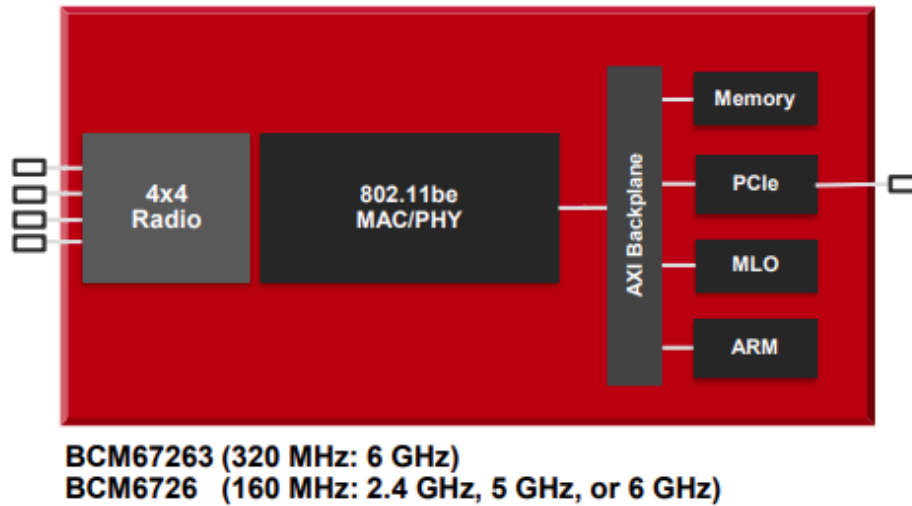
106. Broadcom has and continues to directly and/or indirectly infringe one or more claims of the '901 patent in this judicial district and elsewhere in Texas and the United States.

107. Broadcom directly infringes the '901 patent via 35 U.S.C. § 271(a) by using and/or testing the Accused Products, their components and processes, and/or products containing the same that incorporate the fundamental technologies covered by the '901 patent. As another example, Broadcom infringes each step of the one or more method claims of the '901 patent because the Broadcom Accused Products automatically, and without user modification, perform each of the claimed steps that are controlled by Broadcom.

108. Furthermore, Broadcom, Inc. directly infringes the '901 patent through its direct involvement in the activities of its subsidiaries, including Broadcom Corporation. Such subsidiaries conduct activities that constitute direct infringement of the '901 patent under 35 U.S.C. § 271(a) by using and/or testing those Accused Products, their components and processes, and/or products containing the same that incorporated the fundamental technologies covered by the '901 patent. Further, Defendants are vicariously liable for this infringing conduct of their respective subsidiaries (under both the alter ego and agency theories) because, as an example and on information and belief, Broadcom, Inc., Broadcom Corporation, and their subsidiaries and related companies are essentially the same company, and Broadcom, Inc. and Broadcom Corporation have the right and ability to control their subsidiaries infringing acts and receive a direct financial benefit from the infringement of its subsidiaries. Furthermore, on information and belief, Broadcom, Inc. and Broadcom Corporation makes and sells the Accused Products outside

of the United States, delivers those products to manufacturers, customers, distributors, and/or subsidiaries in the United States, or in the case that it delivers the Accused Products outside of the United States it does so intending and/or knowing that those products or products that are manufactured to include Broadcom's Accused Products are destined for the United States and/or designing those products for inclusion in other products to be used in the United States, thereby directly infringing the '901 patent. *See, e.g., Lake Cherokee Hard Drive Techs., L.L.C. v. Marvell Semiconductor, Inc.*, 964 F. Supp. 2d 653, 658 (E.D. Tex. 2013).

109. For example, Broadcom infringes claim 1 of the '901 patent via the Accused Products. The Accused Products, including the BCM6726 series, transmit modulation signals. *See, e.g.,* Sections 19.1.1 and 19.1.2 of IEEE 802.11 2016; <https://www.broadcom.com/products/wireless/wireless-lan-infrastructure/bcm67263> (Broadcom advertising that the BCXM6726 is MAC/PHY/radio device); <https://docs.broadcom.com/doc/6726X-PB1XX>:



BCM67263 & BCM6726 Specifications	
Parameter	Details
Wi-Fi Standards	IEEE 802.11be (Wi-Fi 7) Release 1.0 compliant IEEE 802.11ax (Wi-Fi 6 & 6E) compliant IEEE 802.11 a/b/g/n/ac
Spatial Streams	Quad-stream 4x4
Spectral Bands	2.4 GHz 5 GHz 6 GHz

110. The Accused Products, including the BCM6726 series, each generate a plurality of modulation signals each of which is to be transmitted from a different one of a plurality of antennas, where each modulation signal is to include one or more preamble symbol groups each consisting of a plurality of preamble symbols used for demodulation. For example, the Accused Products generate modulation signals (e.g., HT-mixed format PPDU) which are to be transmitted from a plurality of antennas. *See, e.g.*, Sections 19.3.3 of IEEE 802.11 2016. Each OFDM symbol within a modulation signal comprises a pilot symbol sequence consisting of four pilot symbols used for demodulation. *See, e.g.*, Sections 17.3.5.9 and 19.3.11.10 of IEEE 802.11 2016.

111. The Accused Products, including the BCM6726 series, each insert the one or more preamble symbol groups at the same one or more temporal points in each modulation signal, wherein the one or more preamble symbol groups at the one or more temporal points are orthogonal to other preamble symbol groups at the same one or more temporal points with zero mutual

correlation among the plurality of modulation signals, each preamble symbol having a non-zero amplitude, and each preamble symbol group consisting of preamble symbols the quantity of which is greater than that of the plurality of modulation signals to be transmitted. For example, each of the Accused Products insert one or more OFDM symbols comprising a pilot symbol sequence in each modulation signal, where each modulation signal that are to be sent from different antennas are transmitted simultaneously in time. *See, e.g.*, Section 19.3.11.10 of IEEE 802.11 2016. The pilot symbol sequences corresponding to different spatial streams are orthogonal at the same one or more temporal points with zero mutual correlation among the plurality of spatial streams. *See, e.g.*, Table 19-19 of IEEE 802.11 2016. The pilot symbols are BPSK modulated and have a non-zero amplitude. *See, e.g.*, Section 17.3.5.9 of IEEE 802.11 2016. Each pilot symbol sequence contains four pilot symbols, which is greater than the modulation signals to be transmitted by two or three antennas. *See, e.g.*, Sections 19.1.1 and 19.3.11.10 of IEEE 802.11 2016.

112. The Accused Products, including the BCM6726 series, each transmit the plurality of modulation signals, each comprising transmission data, which is different between the plurality of modulation signals, and the one or more preamble symbol groups, from the plurality of antennas, respectively, in an identical frequency band. For example, each of the Accused Products transmit the plurality of modulation signals comprising transmission data and the pilot symbol sequence from the two or three antennas in the same channel having a particular width (*e.g.*, 20 MHz). *See, e.g.*, Section 19.3.15.1, Tables 19-28, 19-29, and 19-30, and Figure 17-13 of IEEE 802.11 2016. Each stream of data to be transmitted is divided into multiple spatial streams to form respective modulation signals having different transmission data during the encoding process. *See, e.g.*, Section 19.3.4 of IEEE 802.11 2016.

113. The specific ways in which the Accused Products, including the BCM6726 series, are configured to support the aforementioned features of IEEE 802.11n and/or 802.11ac and/or 802.11ax and/or IEEE 802.11be are further detailed in confidential documents and/or source code that evidence infringement by the Accused Products, including the BCM6726 series, as to Claim 1 of the '901 patent.

114. Furthermore, the Accused Products, including the BCM6726 series, are configured or implemented in an infringing manner with the features and functionality recited in at least Claim 1 of the '901 patent.

115. The technology discussion above and the exemplary Accused Products provide context for Plaintiff's infringement allegations.

116. The claims of the '901 patent are patent eligible under 35 U.S.C. § 101. The '901 patent is not directed to an ineligible abstract idea. For example, it is not a mathematical algorithm executed on a generic computer or a fundamental economic business practice. Instead, it is a technologically complex, particularized method of transmitting modulation signals. As the '901 patent explains, the "present invention aims to provide a transmission method for estimating channels accurately and with ease from multiplexed modulation signals." '901 patent, 1:50-52. The '901 patent further explains that the "conventional structure gives no thought to the synchronization between channels in the same frequency band as well as a frequency offset. As a result, this structure encounters the difficulty of achieving the most important factor in order to demultiplex a multiplexed signal, namely, obtaining an accuracy of estimating channels." '901 patent, 1:41-45.

117. The '901 patent provides the technical solution above by, for example, "plac[ing] the symbols used for demodulation at an identical time of the respective channels and orthogonally

to each other.” ’901 patent, 2:16-18. The ’901 patent explains that “[t]his preparation, i.e. the symbols used for demodulation are placed to be orthogonal to each other, allows the reception apparatus to isolate the symbols with ease for estimating channels.” ’901 patent, 2:18-22. That solution is reflected in the claims of the ’901 patent such as independent claim 1.

118. At a minimum, Broadcom, Inc. and Broadcom Corporation have known of the ’901 patent at least as early as the filing date of the Complaint. In addition, Broadcom, Inc. and Broadcom Corporation have known about the ’901 patent since at least November 2021, when Broadcom, Inc. and Broadcom Corporation received notice of their infringement of the ’901 patent via a letter sent by Redwood on November 3, 2021. Redwood sent several follow-up letters to Broadcom, including letters sent on January 4, 2022 and March 2, 2022. In May 2022, Broadcom, Inc. and Broadcom Corporation received further notice of their infringement of the ’901 patent when Redwood sent a second letter providing notice of their infringement on May 12, 2022. Redwood again sent a follow-up letter to Broadcom, Inc. and Broadcom Corporation on September 13, 2022 and two follow-up letters to Broadcom, Inc. and Broadcom Corporation on September 14, 2022. On September 19, 2022, Broadcom, Inc. and Broadcom Corporation finally replied to Redwood via e-mail, where Redwood provided Broadcom, Inc. and Broadcom Corporation access to its data room for the infringement chart of the ’901 patent, where Broadcom, Inc. and Broadcom Corporation were provided further notice of their infringement. Based on information and belief, Broadcom, Inc. was on notice of the ’901 patent from at least the foregoing dates that Broadcom Corporation was on notice of the ’901 patent as a result of receiving actual or constructive notice from Broadcom Corporation, which is owned and controlled by its parent Broadcom, Inc.<sup>6</sup> Furthermore, Broadcom Corporation was on notice of the ’901 patent from at least the foregoing

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<sup>6</sup> See FN 2, *supra*.



dates that Broadcom, Inc. was on notice of the '901 patent as a result of receiving actual or constructive notice from Broadcom, Inc., which wholly owns and controls Broadcom Corporation, which is an agent and alter ego of Broadcom, Inc.<sup>7</sup>

119. On information and belief, since at least the above-mentioned dates when Broadcom was on notice of its infringement, Broadcom has actively induced, under U.S.C. § 271(b), distributors, customers, subsidiaries, importers, partners, affiliates, resellers, manufacturers, end users, and/or consumers to directly infringe one or more claims of the '901 patent by testing and/or using the Accused Products. Since at least the notice provided on the above-mentioned dates, Broadcom does so with knowledge, or with willful blindness of the fact, that the induced acts constitute infringement of the '901 patent. Broadcom intends to cause, and has taken affirmative steps to induce infringement by distributors, customers, subsidiaries, importers, partners, affiliates, resellers, manufacturers, end users, and/or consumers by at least, inter alia, creating advertisements that promote the infringing use of the Accused Products, creating and/or maintaining and/or knowledge of established distribution channels for the Accused Products into and within the United States, manufacturing the Accused Products in conformity with U.S. laws and regulations, manufacturing the Accused Products in conformity with the relevant IEEE 802.11 standards, distributing or making available instructions or manuals for the Accused Products to purchasers and prospective buyers, providing the accused functionalities via hardware, software, and/or firmware that are included in the Accused Products that are then used and/or tested by distributors, customers, subsidiaries, importers, partners, affiliates, resellers, manufacturers, end users, and/or consumers, testing and certifying features related to infringing

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<sup>7</sup> See FN 2, *supra*.

features in the Accused Products, and/or providing technical support, replacement parts, or services for these products to these purchasers and/or sellers in the United States.

120. On information and belief, since at least the above-mentioned dates when Broadcom was on notice of its infringement, Broadcom's contributory infringement pursuant to 35 U.S.C. § 271(c) includes offering to sell and/or license, selling and/or licensing, and/or providing within the United States, or importing into the United States, components of the patented invention of one or more claims of the '901 patent, constituting a material part of the invention. On information and belief, Broadcom knows and has known the same to be especially made or especially adapted for use in an infringement of the '901 patent by making the Broadcom Accused Products in conformity with the relevant IEEE 802.11 standards, and such components are not a staple article or commodity of commerce suitable for substantial noninfringing use. For example, Broadcom offers to sell, sells, and/or licenses or otherwise provides hardware and/or software/firmware components of the Accused Products within the United States; the components constitute a material part of the claimed inventions of the '901 patent that are especially made or especially adapted for use in end user products that infringe the '901 patent; and the components are not a staple article or commodity of commerce suitable for substantial noninfringing use.

121. On information and belief, despite having knowledge of the '901 patent and knowledge that it is directly and/or indirectly infringing one or more claims of the '901 patent, Broadcom has nevertheless continued its infringing conduct and disregarded an objectively high likelihood of infringement. Broadcom's infringing activities relative to the '901 patent have been, and continue to be, willful, wanton, malicious, in bad-faith, deliberate, consciously wrongful, flagrant, characteristic of a pirate, and an egregious case of misconduct beyond typical

infringement such that Plaintiff is entitled under 35 U.S.C. § 284 to enhanced damages up to three times the amount found or assessed.

122. Redwood has been damaged as a result of Broadcom's infringing conduct described in this Count. Broadcom is, thus, liable to Redwood in an amount that adequately compensates Redwood for Broadcom's infringements, which, by law, cannot be less than a reasonable royalty, together with interest and costs as fixed by this Court under 35 U.S.C. § 284.

#### **COUNT IV**

##### **(INFRINGEMENT OF U.S. PATENT NO. 7,974,371)**

123. Plaintiff incorporates paragraphs 1 through 122 herein by reference.

124. Redwood is the assignee of the '371 patent, entitled "Communication Method and Radio Communication Apparatus," with ownership of all substantial rights in the '371 patent, including the right to exclude others and to enforce, sue, and recover damages for past and future infringements.

125. The '371 patent is valid, enforceable, and was duly issued in full compliance with Title 35 of the United States Code. The '371 patent issued from U.S. Patent Application No. 10/486,896.

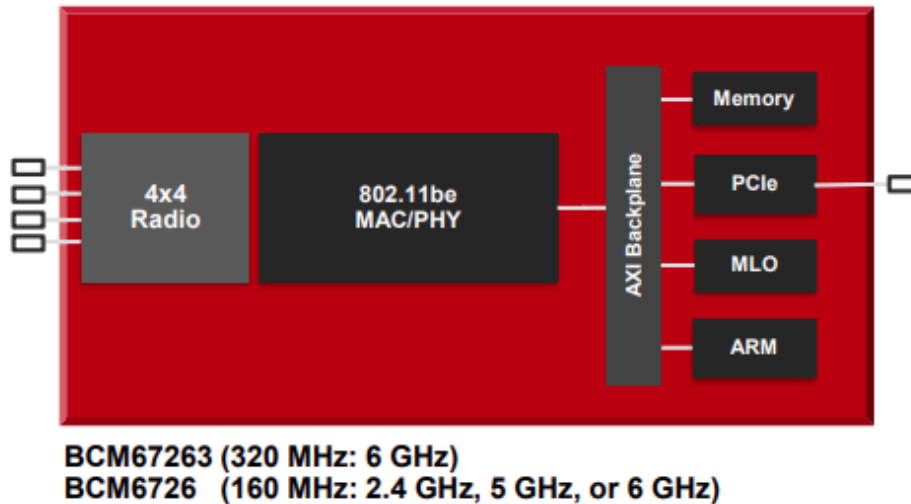
126. Broadcom has and continues to directly and/or indirectly infringe one or more claims of the '371 patent in this judicial district and elsewhere in Texas and the United States.

127. Broadcom directly infringes the '371 patent via 35 U.S.C. § 271(a) by making, using, offering for sale, selling, and/or importing the Accused Products, their components and processes, and/or products containing the same that incorporate the fundamental technologies covered by the '371 patent.

128. Furthermore, Broadcom, Inc. directly infringes the '371 patent through its direct involvement in the activities of its subsidiaries, including Broadcom Corporation. Such

subsidiaries conduct activities that constitute direct infringement of the '371 patent under 35 U.S.C. § 271(a) by making, using, testing, offering for sale, selling, and/or importing those Accused Products, their components and processes, and/or products containing the same that incorporated the fundamental technologies covered by the '371 patent. Further, Defendants are vicariously liable for this infringing conduct of its subsidiaries (under both the alter ego and agency theories) because, as an example and on information and belief, Broadcom, Inc, Broadcom Corporation, and their subsidiaries and related companies are essentially the same company, and Broadcom Inc. and Broadcom Corporation have the right and ability to control their subsidiaries infringing acts and receive a direct financial benefit from the infringement of its subsidiaries. Furthermore, on information and belief, Broadcom sells and makes the Accused Products outside of the United States, delivers those products to manufacturers, customers, distributors, and/or subsidiaries in the United States, or in the case that it delivers the Accused Products outside of the United States it does so intending and/or knowing that those products or products that are manufactured to include Broadcom's Accused Products are destined for the United States and/or designing those products for inclusion in other products to be placed on sale and used in the United States, thereby directly infringing the '371 patent. *See, e.g., Lake Cherokee Hard Drive Techs., L.L.C. v. Marvell Semiconductor, Inc.*, 964 F. Supp. 2d 653, 658 (E.D. Tex. 2013).

129. For example, Broadcom infringes claim 14 of the '371 patent via the Accused Products, including the BCM6726 series. The Accused Products, including the BCM6726 series, comprise a radio transmission apparatus. *See, e.g.,* Fig. 19-2 of IEEE 802.11 2016; <https://www.broadcom.com/products/wireless/wireless-lan-infrastructure/bcm67263> (Broadcom advertising that the BCXM6726 is MAC/PHY/radio device); <https://docs.broadcom.com/doc/6726X-PB1XX>:



BCM67263 & BCM6726 Specifications	
Parameter	Details
Wi-Fi Standards	IEEE 802.11be (Wi-Fi 7) Release 1.0 compliant IEEE 802.11ax (Wi-Fi 6 & 6E) compliant IEEE 802.11 a/b/g/n/ac
Spatial Streams	Quad-stream 4x4
Spectral Bands	2.4 GHz 5 GHz 6 GHz

130. The Accused Products, including the BCM6726 series, each comprise circuitry and/or components (hardware and/or software) comprising a transmission method determining unit configured to select one of a first transmission method and a second transmission method based on received information of an estimated radio-wave propagation environment corresponding to a communication partner. For example, the Accused Products receive information associated with a channel quality assessment to select an appropriate Modulation and Coding Scheme (MCS) for Accused Products to utilize in subsequent transmissions to a receiving station, where the MCS value is utilized to determine the modulation, coding, and number of spatial channels based on information associated with the channel quality assessment. *See, e.g.*, Sections 19.3.13.4 and 19.3.5 of IEEE 802.11 2016.

131. The Accused Products, including the BCM6726 series, each comprise circuitry and/or components (hardware and/or software) comprising a modulation signal generator

configured to generate a single modulation signal if said transmission method determining unit choose selects said first transmission method, and to generate a plurality of modulation signals which include different information from each other for transmission to an identical frequency band at an identical temporal point, if said transmission method determining unit selects said second transmission method. For example, if the MCS indicates that a transmission will utilize only one spatial stream, the Accused Products generate a single modulation signal. *See, e.g.*, Section 19.3.5 of IEEE 802.11 2016. If the MCS indicates that a transmission will include multiple spatial streams for, *e.g.*, spatial multiplexing, a plurality of modulation signals are produced, where each of the modulation signals represents a respective spatial stream and each spatial stream includes distinct information. *See, e.g.*, Section 19.3.5 of IEEE 802.11 2016. Spatial multiplexing increases bandwidth by transmitting data over multiple available spatial channels. Transmissions are simultaneous and are transmitted using the same channel having a particular width (*e.g.*, 20 MHz). *See, e.g.*, Section 19.3.15.1 and Tables 19-28, 19-29, and 19-30 of IEEE 802.11 2016.

132. The single modulation signal and the plurality of modulation signals contain information indicating the number of modulation signals to multiplex and transmit at the same time. For example, all HT transmissions of the Accused Products, including the BCM6726 series, utilize an HT-SIG, which contains an MCS that indicates the number of modulation signals to multiplex and transmit at the same time. *See, e.g.*, Sections 19.3.9.4.3 and 19.3.5 of IEEE 802.11 2016.

133. The specific ways in which the Accused Products, including the BCM6726 series, are configured to support the aforementioned features of IEEE 802.11n and/or IEEE 802.11ac and/or IEEE 802.11ax and/or IEEE 802.11be are further detailed in confidential documents and/or

source code that evidence infringement by the Accused Products as to at least Claim 14 of the '371 patent.

134. Furthermore, the Accused Products, including the BCM6726 series, are configured or implemented in an infringing manner with the features and functionality recited in at least Claim 14 of the '371 patent.

135. The technology discussion above and the exemplary Accused Products provide context for Plaintiff's infringement allegations.

136. The claims of the '371 patent are patent eligible under 35 U.S.C. § 101. The '371 patent is not directed to an ineligible abstract idea. For example, it is not a mathematical algorithm executed on a generic computer or a fundamental economic business practice. Instead, it offers, for example, a technologically complex communication method and a radio communication apparatus that, for example, "switches between the method of transmitting modulation signals of a plurality of channels to the same frequency band from a plurality of antennas and the method of transmitting a modulation signal of one channel from an antenna." '371 patent, 4:27-31. This allows the transmitter to choose which of these transmission methods is used, based on estimated channel conditions. The '371 patent explains that "when the communication method is used, which multiplexes modulation signals of a plurality of channels to the same frequency band, a receiver transmits the information of an estimated radio-wave propagation environment to a transmitter. The transmitter then selects a communication method based on the information. Multiplexing modulation signals of a plurality of channels to the same frequency band by using the foregoing method can increase the data transmission rate. At the same time, a radio communication apparatus of the present invention can advantageously demultiplex the multiplexed modulation signals

received with ease.” ’371 patent, 5:4-16. That solution is reflected in, for example, claim 14 of the ’371 patent.

137. At a minimum, Broadcom, Inc. and Broadcom Corporation have known of the ’371 patent at least as early as the filing date of the Complaint. In addition, Broadcom, Inc. and Broadcom Corporation have known about the ’371 patent since at least November 2021, when Broadcom, Inc. and Broadcom Corporation received notice of their infringement of the ’371 patent via a letter sent by Redwood on November 3, 2021. Redwood sent several follow-up letters to Broadcom, including letters sent on January 4, 2022 and March 2, 2022. In May 2022, Broadcom, Inc. and Broadcom Corporation received further notice of their infringement of the ’371 patent when Redwood sent a second letter providing notice of their infringement on May 12, 2022. Redwood again sent a follow-up letter to Broadcom, Inc. and Broadcom Corporation on September 13, 2022 and two follow-up letters to Broadcom, Inc. and Broadcom Corporation on September 14, 2022. On September 19, 2022, Broadcom, Inc. and Broadcom Corporation finally replied to Redwood via e-mail, where Redwood provided Broadcom, Inc. and Broadcom Corporation access to its data room for the infringement chart of the ’371 patent, where Broadcom, Inc. and Broadcom Corporation were provided further notice of their infringement. Based on information and belief, Broadcom, Inc. was on notice of the ’371 patent from at least the foregoing dates that Broadcom Corporation was on notice of the ’371 patent as a result of receiving actual or constructive notice from Broadcom Corporation, which is owned and controlled by its parent Broadcom, Inc.<sup>8</sup> Furthermore, Broadcom Corporation was on notice of the ’371 patent from at least the foregoing dates that Broadcom, Inc. was on notice of the ’371 patent as a result of receiving actual or

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<sup>8</sup> See FN 2, *supra*.



constructive notice from Broadcom, Inc., which wholly owns and controls Broadcom Corporation, which is an agent and alter ego of Broadcom, Inc.<sup>9</sup>

138. On information and belief, since at least the above-mentioned dates when Broadcom was on notice of its infringement, Broadcom has actively induced, under U.S.C. § 271(b), distributors, customers, subsidiaries, importers, partners, affiliates, resellers, manufacturers, end users, and/or consumers to directly infringe one or more claims of the '371 patent by making, using, offering for sale, selling, and/or importing the Accused Products. Since at least the notice provided on the above-mentioned dates, Broadcom does so with knowledge, or with willful blindness of the fact, that the induced acts constitute infringement of the '371 patent. Broadcom intends to cause, and has taken affirmative steps to induce infringement by distributors, customers, subsidiaries, importers, partners, affiliates, resellers, manufacturers, end users, and/or consumers by at least, inter alia, creating advertisements that promote the infringing use of the Accused Products, creating and/or maintaining and/or knowledge of established distribution channels for the Accused Products into and within the United States, manufacturing the Accused Products in conformity with U.S. laws and regulations, manufacturing the Accused Products in conformity with the relevant IEEE 802.11 standards, distributing or making available instructions or manuals for the Accused Products to purchasers and prospective buyers, providing the accused functionalities via hardware, software, and/or firmware that are included in the Accused Products to manufacturers, purchasers, sellers, distributors, and/or end users, testing and certifying features related to infringing features in the Accused Products, and/or providing technical support, replacement parts, or services for these products to these purchasers and/or sellers in the United States.

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<sup>9</sup> See FN 2, *supra*.

139. On information and belief, despite having knowledge of the '371 patent and their infringement, Defendants specifically intended for others to import and sell products accused of infringing the '371 patent. For example, Defendants specifically intended for its U.S.-based subsidiaries or customers to import and sell products accused of infringing the '371 patent. On information and belief, Defendants instructed and encouraged the importers to import and/or sell products accused of infringing the '371 patent. On information and belief, the purchase and sale agreements between Broadcom, Inc., Broadcom Corporation, and the importers provide such instruction and/or encouragement. Further, on information and belief, Defendants' U.S.-based subsidiaries, affiliates, employees, agents, and/or related companies existed for inter alia, the purpose of importing and selling products accused of infringing the '371 patent in the United States.

140. On information and belief, since at least the above-mentioned dates when Broadcom was on notice of its infringement, Broadcom's contributory infringement pursuant to 35 U.S.C. § 271(c) includes offering to sell and/or license, selling and/or licensing, and/or providing within the United States, or importing into the United States, components of the patented invention of one or more claims of the '371 patent, constituting a material part of the invention. On information and belief, Broadcom knows and has known the same to be especially made or especially adapted for use in an infringement of the '371 patent by making the Accused Products in conformity with the relevant IEEE 802.11 standards, and such components are not a staple article or commodity of commerce suitable for substantial noninfringing use. For example, Broadcom offers to sell, sells, and/or licenses or otherwise provides hardware and/or software/firmware components of the Accused Products within the United States; the components constitute a material part of the claimed inventions of the '371 patent that are especially made or

especially adapted for use in end user products that infringe the '371 patent; and the components are not a staple article or commodity of commerce suitable for substantial noninfringing use.

141. On information and belief, since at least the above-mentioned dates when Broadcom was on notice of its infringement, Broadcom's infringement pursuant to 35 U.S.C. § 271(f)(1) includes supplying or causing to be supplied in or from the United States all or a substantial portion of the components of the patented invention of one or more claims of the '371 patent, where such components are uncombined in whole or in part, in such manner as to actively induce the combination of such components outside of the United States in a manner that would infringe the patent if such combination occurred within the United States. For example, Broadcom supplies or causes to be supplied in or from the United States the hardware and/or software/firmware components of the Accused Products that comprise all or a substantial portion of the components of the patented inventions of the '371 patent, where Broadcom actively induces the combination of such components outside of the United States in a manner that would infringe the patent if such combination occurred within the United States. In another example, Broadcom supplies or causes to be supplied in or from the United States the hardware and/or software/firmware components of the Accused Products that comprise all or a substantial portion of the components of the patented inventions of the '371 patent, where Broadcom actively induces the combination of the hardware and/or software/firmware components with other components of an end user device outside of the United States in a manner that would infringe the patent if such combination occurred within the United States. Broadcom intends to cause, and has taken affirmative steps to induce infringement by distributors, customers, subsidiaries, importers, partners, affiliates, resellers, manufacturers, and/or consumers by at least, inter alia, creating advertisements that promote the infringing use of the Accused Products, creating and/or

maintaining and/or knowledge of established distribution channels for the Accused Products into and within the United States, manufacturing the components of the Accused Products in conformity with U.S. laws and regulations, manufacturing the components of the Accused Products in conformity with the relevant IEEE 802.11 standards, distributing or making available instructions or manuals or marketing materials regarding the combination of the hardware and software/firmware components, distributing or making available instructions or manuals or marketing materials regarding the combination of the hardware and/or software/firmware components with other components as part of making an end user device in part or in whole, testing and certifying features related to infringing features in the Accused Products, providing software and/or firmware for the Accused Products to manufacturers, purchasers, sellers, distributors, and/or end users, and/or providing technical support, replacement parts, or services for these products to these purchasers and/or sellers in the United States.

142. On information and belief, since at least the above-mentioned dates when Broadcom was on notice of its infringement, Broadcom's infringement pursuant to 35 U.S.C. § 271(f)(2) includes supplying or causing to be supplied in or from the United States components of the patented invention of one or more claims of the '371 patent that are especially made or especially adapted for use in the invention and not staple articles or commodities of commerce suitable for substantial noninfringing use, where such components are uncombined in whole or in part, knowing that such components are so made or adapted and intending that such components will be combined outside of the United States in a manner that would infringe the patent if such combination occurred within the United States. For example, Broadcom supplies or causes to be supplied in or from the United States the hardware and/or software/firmware components that comprise all or a substantial portion of the components of the patented inventions of the '371

patent, where such components are uncombined in whole or in part, knowing that such components are especially made or especially adapted for use in the invention and not staple articles or commodities of commerce suitable for substantial noninfringing use and intending that such components will be combined outside of the United States in a manner that would infringe the patent if such combination occurred within the United States. In another example, Broadcom supplies or causes to be supplied in or from the United States the hardware and/or software/firmware components that comprise all or a substantial portion of the components of the patented inventions of the '371 patent, where such components are uncombined in whole or in part with other components of an end user device, knowing that such components are especially made or especially adapted for use in the invention and not staple articles or commodities of commerce suitable for substantial noninfringing use and intending that such components will be combined with other components of an end user device outside of the United States in a manner that would infringe the patent if such combination occurred within the United States.

143. On information and belief, despite having knowledge of the '371 patent and knowledge that it is directly and/or indirectly infringing one or more claims of the '371 patent, Broadcom has nevertheless continued its infringing conduct and disregarded an objectively high likelihood of infringement. Broadcom's infringing activities relative to the '371 patent have been, and continue to be, willful, wanton, malicious, in bad-faith, deliberate, consciously wrongful, flagrant, characteristic of a pirate, and an egregious case of misconduct beyond typical infringement such that Plaintiff is entitled under 35 U.S.C. § 284 to enhanced damages up to three times the amount found or assessed.

144. Redwood has been damaged as a result of Broadcom's infringing conduct described in this Count. Broadcom is, thus, liable to Redwood in an amount that adequately compensates

Redwood for Broadcom's infringements, which, by law, cannot be less than a reasonable royalty, together with interest and costs as fixed by this Court under 35 U.S.C. § 284.

**COUNT V**

(INFRINGEMENT OF U.S. PATENT NO. 8,155,224)

145. Plaintiff incorporates paragraphs 1 through 144 herein by reference.

146. Redwood is the assignee of the '224 patent, entitled "Transmission Method, Transmission Apparatus, and Reception Apparatus," with ownership of all substantial rights in the '224 patent, including the right to exclude others and to enforce, sue, and recover damages for past and future infringements.

147. The '224 patent is valid, enforceable, and was duly issued in full compliance with Title 35 of the United States Code. The '224 patent issued from U.S. Patent Application No. 12/698,917.

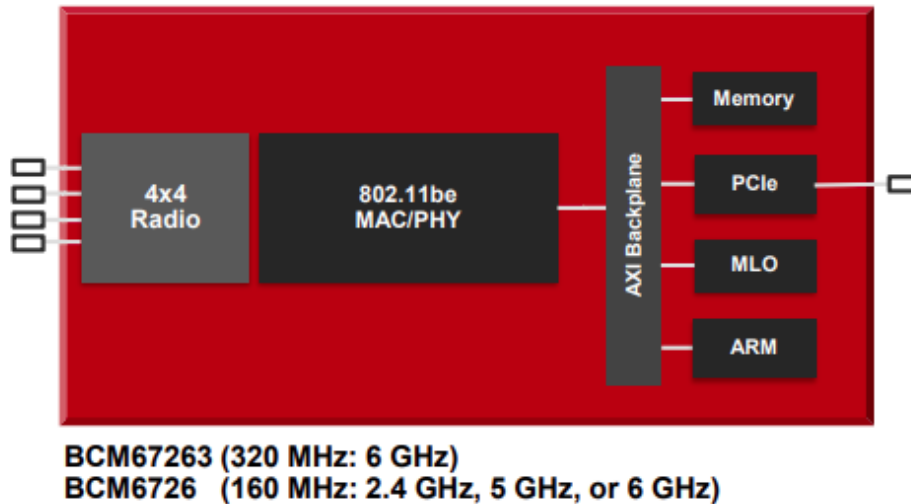
148. Broadcom has and continues to directly and/or indirectly infringe one or more claims of the '224 patent in this judicial district and elsewhere in Texas and the United States.

149. Broadcom directly infringes the '224 patent via 35 U.S.C. § 271(a) by using and/or testing the Accused Products, their components and processes, and/or products containing the same that incorporate the fundamental technologies covered by the '224 patent. As another example, Broadcom infringes each step of the one or more method claims of the '224 patent because the Broadcom Accused Products automatically, and without user modification, perform each of the claimed steps that are controlled by Broadcom.

150. Furthermore, Furthermore, Broadcom, Inc. directly infringes the '224 patent through its direct involvement in the activities of its subsidiaries, including Broadcom Corporation. Such subsidiaries conduct activities that constitute direct infringement of the '224 patent under 35 U.S.C. § 271(a) by using and/or testing those Accused Products, their components and processes,

and/or products containing the same that incorporated the fundamental technologies covered by the '224 patent. Further, Defendants are vicariously liable for this infringing conduct of their respective subsidiaries (under both the alter ego and agency theories) because, as an example and on information and belief, Broadcom, Inc., Broadcom Corporation, and their subsidiaries and related companies are essentially the same company, and Broadcom, Inc. and Broadcom Corporation have the right and ability to control their subsidiaries infringing acts and receive a direct financial benefit from the infringement of its subsidiaries. Furthermore, on information and belief, Broadcom, Inc. and Broadcom Corporation makes and sells the Accused Products outside of the United States, delivers those products to manufacturers, customers, distributors, and/or subsidiaries in the United States, or in the case that it delivers the Accused Products outside of the United States it does so intending and/or knowing that those products or products that are manufactured to include Broadcom's Accused Products are destined for the United States and/or designing those products for inclusion in other products to be used in the United States, thereby directly infringing the '224 patent. *See, e.g., Lake Cherokee Hard Drive Techs., L.L.C. v. Marvell Semiconductor, Inc.*, 964 F. Supp. 2d 653, 658 (E.D. Tex. 2013).

151. For example, Broadcom infringes claim 1 of the '224 patent via the Accused Products. The Accused Products, including the BCM6726 series, perform a method of transmitting modulation signals. *See, e.g.,* Sections 19.1.1 and 19.1.2 of IEEE 802.11 2016; <https://www.broadcom.com/products/wireless/wireless-lan-infrastructure/bcm67263> (Broadcom advertising that the BCXM6726 is MAC/PHY/radio device); <https://docs.broadcom.com/doc/6726X-PB1XX>:



BCM67263 & BCM6726 Specifications	
Parameter	Details
Wi-Fi Standards	IEEE 802.11be (Wi-Fi 7) Release 1.0 compliant IEEE 802.11ax (Wi-Fi 6 & 6E) compliant IEEE 802.11 a/b/g/n/ac
Spatial Streams	Quad-stream 4x4
Spectral Bands	2.4 GHz 5 GHz 6 GHz

152. The Accused Products, including the BCM6726 series, each generate a plurality of modulation signals, where each modulation signal to be transmitted from a different one of a plurality of antennas, where each modulation signal includes a pilot symbol sequence consisting of a plurality of pilot symbols used for demodulation. For example, each of the Accused Products generates modulation signals (e.g., HT-mixed format PPDU) which are to be sent to a plurality of antennas. *See, e.g.*, Section 19.3.3 of IEEE 802.11 2016. Each OFDM symbol includes a pilot symbol sequence consisting of four pilot symbols used for demodulation. *See, e.g.*, Sections 17.3.5.9 and 19.3.11.10 of IEEE 802.11 2016.

153. Each of the Accused Products, including the BCM6726 series, insert each of the pilot symbol sequences at the same temporal point in each modulation signal, wherein the pilot symbol sequences are orthogonal to each other with zero mutual correlation among the plurality of modulation signals, where each pilot symbol has a non-zero amplitude, where the quantity of



the plurality of pilot symbols in each sequence being greater than the quantity of the plurality of modulation signals to be transmitted. For example, the Accused Products insert each of the four pilot symbol sequences at the same temporal point in each modulation signal. *See, e.g.*, Section 19.3.11.10 of IEEE 802.11 2016. The pilot symbol sequences corresponding to different spatial streams are orthogonal and have zero mutual correlation. *See, e.g.*, Table 19-19 of IEEE 802.11 2016. The pilot symbols are BPSK modulated and have a non-zero amplitude. *See, e.g.*, Section 17.3.5.9 of IEEE 802.11 2016. Each pilot symbol sequence contains four pilot symbols, which is greater than the modulation signals to be transmitted by two or three antennas utilized by the Accused Products. *See, e.g.*, Sections 19.1.1 and 19.3.11.10 of IEEE 802.11 2016.

154. Each of the Accused Products, including the BCM6726 series, transmit in an identical frequency band the plurality of modulation signals from the plurality of antennas, where each modulation signal comprises different transmission data and one of the pilot symbol sequences. For example, each of the Accused Products transmit the plurality of modulation signals in the same channel having a particular width (e.g., 20 MHz) from two or three antennas. *See, e.g.*, Sections 19.3.15.1, Tables 19-28, 19-29, and 19-30, and Figure 17-13 of IEEE 802.11 2016. Each stream of data is divided into multiple spatial streams by the Accused Products to form respective modulation signals comprising different transmission data during encoding. *See, e.g.*, Section 19.3.4 of IEEE 802.11 2016. Further, each of the modulation signals comprises one of the pilot symbol sequences. *See, e.g.*, Section 19.3.11.10 of IEEE 802.11 2016.

155. The specific ways in which the Accused Products, including the BCM6726 series, are configured to support the aforementioned features of IEEE 802.11n and/or IEEE 802.11ac and/or IEEE 802.11ax and/or IEEE 802.11be are further detailed in confidential documents and/or

source code that evidence infringement by the Accused Products as to at least Claim 1 of the '224 patent.

156. Furthermore, the Accused Products, including the BCM6726 series, are configured or implemented in an infringing manner with the features and functionality recited in at least Claim 1 of the '224 patent.

157. The technology discussion above and the exemplary Accused Products provide context for Plaintiff's infringement allegations.

158. The claims of the '224 patent are patent eligible under 35 U.S.C. § 101. The '224 patent is not directed to an ineligible abstract idea. For example, it is not a mathematical algorithm executed on a generic computer or a fundamental economic business practice. Instead, the '224 patent describes a specific problem to be solved in digital signal transmission and communication involving multiplexing modulation signals of a plurality of channels to the same frequency band and its claims are directed to specific ways of solving that problem. '224 patent, 1:21-24. The patent describes that “the foregoing conventional structure gives no thought to the synchronization between channels in the same frequency band as well as a frequency offset. As a result, this structure encounters the difficulty of achieving the most important factor in order to demultiplex a multiplexed signal, namely, obtaining an accuracy of estimating channels.” *Id.* at 1:53-58. “The present invention aims to provide a transmission method for estimating channels accurately and with ease from multiplexed modulation signals.” *Id.* at 1:62-64.

159. To overcome the aforementioned problems, the '224 patent and its claims describe specific solutions for transmitting multiplexed communications. “The transmission method of the present invention transmits modulation signals of a plurality of channels available in the same frequency band from a plurality of antennas. A symbol used for demodulation is inserted in a given

channel at a certain time, while in another channel symbol at the time, the same phase and quadrature signals in the in-phase quadrature plane are made to be zero signals. With this method, multiplexing the modulation signals of a plurality of channels to the same frequency allows increasing a data transmission rate. Because the symbol used for demodulation has not undergone the time multiplexing, so that the demodulation symbol can be isolated with ease at the reception apparatus.” *Id.*, 2:9-21. Claim 1 recites that “each pilot symbol ha[s] a non-zero amplitude.”

160. The ’224 patent and its claims describe another specific solution to overcome the aforementioned problems. “The transmission method of the present invention places the symbols used for demodulation at an identical time of the respective channels and orthogonally to each other. This preparation, i.e., the symbols used for demodulation are placed to be orthogonal to each other, allows the reception apparatus to isolate the symbols with ease for estimating channels.” *Id.*, 2:28-34. This additional solution is recited by claim 1 by the steps of “inserting each of the pilot symbol sequences at the same temporal point in each modulation signal, wherein the pilot symbol sequences are orthogonal to each other.” *Id.*, claim 1.

161. The ’224 patent describes a specific problem to be solved in multiplexing modulation signals from a plurality of antennas and its claims are directed to specific ways of solving that problem. That solution is further implemented in the claims, including claim 1. Therefore, the claims of ’224 patent are patent eligible. In addition, the claims of the ’224 Patent are directed to solving problems that solely arise in computer technology (digital signal communication and transmission) via a specific improvement to its operation. For example, the claims are directed to a specific improvement in wireless systems as to multiplexing modulation signals of a plurality of channels to the same frequency band. As such, they are not patent ineligible abstract ideas.

162. The claims also survive step two of Alice because they recite an inventive concept that provides features that are more than well-understood, routine, conventional activity. *See e.g.*, '224 patent, claim 1, 1:53-64, 2:9-21, 2:28-34.

163. At a minimum, Broadcom, Inc. and Broadcom Corporation have known of the '224 patent at least as early as the filing date of the Complaint. In addition, Broadcom, Inc. and Broadcom Corporation have known about the '224 patent since at least November 2021, when Broadcom, Inc. and Broadcom Corporation received notice of their infringement of the '224 patent via a letter sent by Redwood on November 3, 2021. Redwood sent several follow-up letters to Broadcom, including letters sent on January 4, 2022 and March 2, 2022. In May 2022, Broadcom, Inc. and Broadcom Corporation received further notice of their infringement of the '224 patent when Redwood sent a second letter providing notice of their infringement on May 12, 2022. Redwood again sent a follow-up letter to Broadcom, Inc. and Broadcom Corporation on September 13, 2022 and two follow-up letters to Broadcom, Inc. and Broadcom Corporation on September 14, 2022. On September 19, 2022, Broadcom, Inc. and Broadcom Corporation finally replied to Redwood via e-mail, where Redwood provided Broadcom, Inc. and Broadcom Corporation access to its data room for the infringement chart of the '224 patent, where Broadcom, Inc. and Broadcom Corporation were provided further notice of their infringement. Based on information and belief, Broadcom, Inc. was on notice of the '224 patent from at least the foregoing dates that Broadcom Corporation was on notice of the '224 patent as a result of receiving actual or constructive notice from Broadcom Corporation, which is owned and controlled by its parent Broadcom, Inc.<sup>10</sup> Furthermore, Broadcom Corporation was on notice of the '224 patent from at least the foregoing dates that Broadcom, Inc. was on notice of the '224 patent as a result of receiving actual or

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<sup>10</sup> *See* FN 2, *supra*.

constructive notice from Broadcom, Inc., which wholly owns and controls Broadcom Corporation, which is an agent and alter ego of Broadcom, Inc.<sup>11</sup>

164. On information and belief, since at least the above-mentioned dates when Broadcom was on notice of its infringement, Broadcom has actively induced, under U.S.C. § 271(b), distributors, customers, subsidiaries, importers, partners, affiliates, resellers, manufacturers, end users, and/or consumers to directly infringe one or more claims of the '224 patent by testing and/or using the Accused Products. Since at least the notice provided on the above-mentioned dates, Broadcom does so with knowledge, or with willful blindness of the fact, that the induced acts constitute infringement of the '224 patent. Broadcom intends to cause, and has taken affirmative steps to induce infringement by distributors, customers, subsidiaries, importers, partners, affiliates, resellers, manufacturers, end users, and/or consumers by at least, inter alia, creating advertisements that promote the infringing use of the Accused Products, creating and/or maintaining and/or knowledge of established distribution channels for the Accused Products into and within the United States, manufacturing the Accused Products in conformity with U.S. laws and regulations, manufacturing the Accused Products in conformity with the relevant IEEE 802.11 standards, distributing or making available instructions or manuals for the Accused Products to purchasers and prospective buyers, providing the accused functionalities via hardware, software, and/or firmware that are included in the Accused Products that are then used and/or tested by distributors, customers, subsidiaries, importers, partners, affiliates, resellers, manufacturers, end users, and/or consumers, testing and certifying features related to infringing features in the Accused Products, and/or providing technical support, replacement parts, or services for these products to these purchasers and/or sellers in the United States.

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<sup>11</sup> See FN 2, *supra*.

165. On information and belief, since at least the above-mentioned dates when Broadcom was on notice of its infringement, Broadcom's contributory infringement pursuant to 35 U.S.C. § 271(c) includes offering to sell and/or license, selling and/or licensing, and/or providing within the United States, or importing into the United States, components of the patented invention of one or more claims of the '224 patent, constituting a material part of the invention. On information and belief, Broadcom knows and has known the same to be especially made or especially adapted for use in an infringement of the '224 patent by making the Broadcom Accused Products in conformity with the relevant IEEE 802.11 standards, and such components are not a staple article or commodity of commerce suitable for substantial noninfringing use. For example, Broadcom offers to sell, sells, and/or licenses or otherwise provides hardware and/or software/firmware components of the Accused Products within the United States; the components constitute a material part of the claimed inventions of the '224 patent that are especially made or especially adapted for use in end user products that infringe the '224 patent; and the components are not a staple article or commodity of commerce suitable for substantial noninfringing use.

166. On information and belief, despite having knowledge of the '224 patent and knowledge that it is directly and/or indirectly infringing one or more claims of the '224 patent, Broadcom has nevertheless continued its infringing conduct and disregarded an objectively high likelihood of infringement. Broadcom's infringing activities relative to the '224 patent have been, and continue to be, willful, wanton, malicious, in bad-faith, deliberate, consciously wrongful, flagrant, characteristic of a pirate, and an egregious case of misconduct beyond typical infringement such that Plaintiff is entitled under 35 U.S.C. § 284 to enhanced damages up to three times the amount found or assessed.

167. Redwood has been damaged as a result of Broadcom's infringing conduct described in this Count. Broadcom is, thus, liable to Redwood in an amount that adequately compensates Redwood for Broadcom's infringements, which, by law, cannot be less than a reasonable royalty, together with interest and costs as fixed by this Court under 35 U.S.C. § 284.

**COUNT VI**

(INFRINGEMENT OF U.S. PATENT NO. 8,744,005)

168. Plaintiff incorporates paragraphs 1 through 167 herein by reference.

169. Redwood is the assignee of the '005 patent, entitled "Method and Apparatus for Generating Modulation Signals," with ownership of all substantial rights in the '005 patent, including the right to exclude others and to enforce, sue, and recover damages for past and future infringements.

170. The '005 patent is valid, enforceable, and was duly issued in full compliance with Title 35 of the United States Code. The '005 patent issued from U.S. Patent Application No. 14/019,346.

171. Broadcom has and continues to directly and/or indirectly infringe one or more claims of the '005 patent in this judicial district and elsewhere in Texas and the United States.

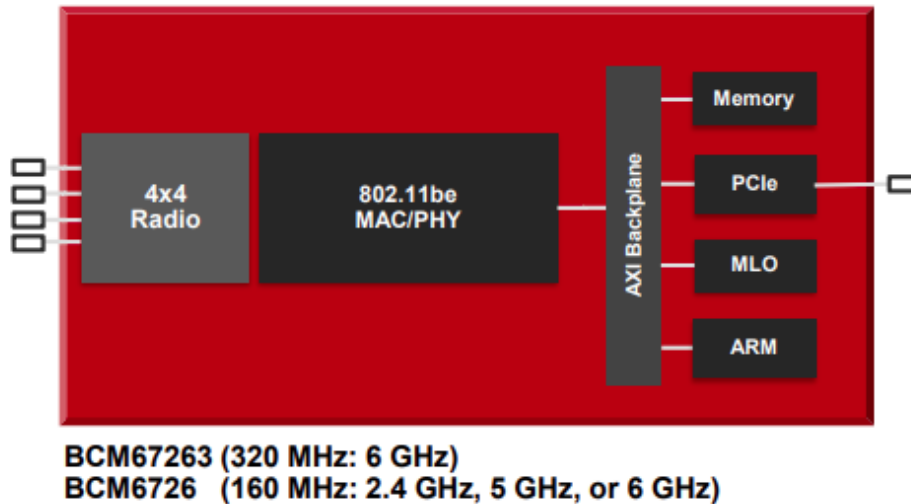
172. Broadcom directly infringes the '005 patent via 35 U.S.C. § 271(a) by making, using, offering for sale, selling, and/or importing the Accused Products, their components and processes, and/or products containing the same that incorporate the fundamental technologies covered by the '005 patent.

173. Furthermore, Broadcom, Inc. directly infringes the '005 patent through its direct involvement in the activities of its subsidiaries, including Broadcom Corporation. Such subsidiaries conduct activities that constitute direct infringement of the '005 patent under 35 U.S.C. § 271(a) by making, using, testing, offering for sale, selling, and/or importing those

Accused Products, their components and processes, and/or products containing the same that incorporated the fundamental technologies covered by the '005 patent. Further, Defendants are vicariously liable for this infringing conduct of its subsidiaries (under both the alter ego and agency theories) because, as an example and on information and belief, Broadcom, Inc, Broadcom Corporation, and their subsidiaries and related companies are essentially the same company, and Broadcom Inc. and Broadcom Corporation have the right and ability to control their subsidiaries infringing acts and receive a direct financial benefit from the infringement of its subsidiaries. Furthermore, on information and belief, Broadcom sells and makes the Accused Products outside of the United States, delivers those products to manufacturers, customers, distributors, and/or subsidiaries in the United States, or in the case that it delivers the Accused Products outside of the United States it does so intending and/or knowing that those products or products that are manufactured to include Broadcom's Accused Products are destined for the United States and/or designing those products for inclusion in other products to be placed on sale and used in the United States, thereby directly infringing the '005 patent. *See, e.g., Lake Cherokee Hard Drive Techs., L.L.C. v. Marvell Semiconductor, Inc.*, 964 F. Supp. 2d 653, 658 (E.D. Tex. 2013).

174. For example, Broadcom infringes claim 9 of the '005 patent via the Accused Products, including the BCM6726 series. The Accused Products, including the BCM6726 series, are each a signal generation apparatus configured to generate modulation signals. For example, the Accused Products are each compliant with IEEE 802.11n, which specifies generating modulation signals. *See, e.g.,* Sections 19.1.1 and 19.1.2 of IEEE 802.11 2016; <https://www.broadcom.com/products/wireless/wireless-lan-infrastructure/bcm67263> (Broadcom advertising that the BCXM6726 is a MAC/PHY/radio device); <https://docs.broadcom.com/doc/6726X-PB1XX>:





BCM67263 & BCM6726 Specifications	
Parameter	Details
Wi-Fi Standards	IEEE 802.11be (Wi-Fi 7) Release 1.0 compliant IEEE 802.11ax (Wi-Fi 6 & 6E) compliant IEEE 802.11 a/b/g/n/ac
Spatial Streams	Quad-stream 4x4
Spectral Bands	2.4 GHz 5 GHz 6 GHz

175. The Accused Products, including the BCM6726 series, comprise one or more processing devices configured to generate a plurality of modulation signals each of which is to be transmitted from a different one of a plurality of antennas in an identical frequency band, wherein each modulation signal includes a pilot symbol sequence each comprising a plurality of pilot symbols used for demodulation. For example, the Accused Products generate modulation signals, e.g., HT-mixed format PPDU, which are to be transmitted from a different one of a plurality of antennas in an identical frequency band (e.g., a 20 MHz channel). *See, e.g.*, Sections 19.3.3, 19.3.15, 19.3.14.1, Tables 19-28, 19-29, 19-30, and Figure 17-13 of IEEE 802.11 2016. Each OFDM symbol within a modulation signal includes a pilot symbol sequence of four pilot symbols, which are used for detecting frequency offsets and phase noise for demodulation. *See, e.g.*, Sections 17.3.5.9 and 19.3.11.10 of IEEE 802.11 2016.

176. The Accused Products, including the BCM6726 series, comprise one or more processing devices configured to insert each of the pilot symbol sequences at the same temporal point in each modulation signal. For example, each modulation signal is made up of OFDM symbols containing a pilot symbol sequence inserted at the same temporal point in each modulation signal, where the modulation signals to be sent from different antennas are transmitted simultaneously in time. *See, e.g.*, Section 19.3.11.10 and Equation 19-54 of IEEE 802.11 2016.

177. The Accused Products, including the BCM6726 series, comprise one or more processing devices configured to output the plurality of modulation signals, each comprising different transmission data and one of the pilot symbol sequences, to the plurality of antennas. For example, the Accused Products divide a stream of data to be transmitted into multiple spatial streams to form respective modulation signals during the encoding and mapping process, where the divided data is then sent to a plurality of antennas. *See, e.g.*, Section 19.3.4 of IEEE 802.11 2016. Each divided stream of data includes one of the pilot symbol sequences. *See, e.g.*, Section 19.3.11.10 of IEEE 802.11 2016.

178. The pilot symbol sequences are orthogonal to each other with zero mutual correlation among the plurality of modulation signals. For example, the pilot sequences corresponding to different spatial streams are orthogonal and have zero mutual correlation, such that the dot product of the two vectors is zero and the vectors are perpendicular in space. *See, e.g.*, Table 19-19 19.1.1 of IEEE 802.11 2016.

179. Each pilot symbol has a non-zero amplitude. For example, the pilot symbols are BPSK modulated and have a non-zero amplitude. *See, e.g.*, Section 17.3.5.9 of IEEE 802.11 2016.

180. A quantity of the plurality of pilot symbols in each sequence are greater than a quantity of the plurality of modulation signals to be transmitted. For example, each pilot symbol

sequence contains four pilot symbols. Therefore, when the modulation signals are to be transmitted using fewer than four antennas, the number of pilot symbols per sequence is greater than the number of modulation signals to be transmitted. *See, e.g.*, Sections 19.1.1, 19.3.11.10, and Equation 19-54 of IEEE 802.11 2016.

181. The specific ways in which the Accused Products, including the BCM6726 series, are configured to support the aforementioned features of IEEE 802.11n and/or 802.11ac and/or 802.11ax and/or IEEE 802.11be are further detailed in confidential documents and/or source code that evidence infringement by the Accused Products as to at least Claim 9 of the '005 patent.

182. Furthermore, the Accused Products, including the BCM6726 series, are configured or implemented in an infringing manner with the features and functionality recited in at least Claim 9 of the '005 patent.

183. The technology discussion above and the exemplary Accused Products provide context for Plaintiff's infringement allegations.

184. The claims of the '005 patent are patent eligible under 35 U.S.C. § 101. The '005 patent is not directed to an ineligible abstract idea. For example, it is not a mathematical algorithm executed on a generic computer or a fundamental economic business practice. Instead, the '005 patent describes a specific problem to be solved in digital signal transmission and communication involving multiplexing modulation signals of a plurality of channels to the same frequency band and its claims are directed to specific ways of solving that problem. '005 patent, 1:23-26. The patent describes that "the foregoing conventional structure gives no thought to the synchronization between channels in the same frequency band as well as a frequency offset. As a result, this structure encounters the difficulty of achieving the most important factor in order to demultiplex a multiplexed signal, namely, obtaining an accuracy of estimating channels." *Id.* at 1:56-61. "The

present invention aims to provide a transmission method for estimating channels accurately and with ease from multiplexed modulation signals.” *Id.* at 1:65-67.

185. To overcome the aforementioned problems, the ’005 patent and its claims describe specific solutions for transmitting multiplexed communications. “The transmission method of the present invention transmits modulation signals of a plurality of channels available in the same frequency band from a plurality of antennas. A symbol used for demodulation is inserted in a given channel at a certain time, while in another channel symbol at the time, the same phase and quadrature signals in the in-phase quadrature plane are made to be zero signals. With this method, multiplexing the modulation signals of a plurality of channels to the same frequency allows increasing a data transmission rate. Because the symbol used for demodulation has not undergone the time multiplexing, so that the demodulation symbol can be isolated with ease at the reception apparatus.” *Id.*, 2:12-24. Claim 9 recites that “each pilot symbol ha[s] a non-zero amplitude.”

186. The ’005 patent and its claims describe another specific solution to overcome the aforementioned problems. “The transmission method of the present invention places the symbols used for demodulation at an identical time of the respective channels and orthogonally to each other. This preparation, i.e., the symbols used for demodulation are placed to be orthogonal to each other, allows the reception apparatus to isolate the symbols with ease for estimating channels.” *Id.*, 2:31-37. This additional solution is recited by claim 9 by the steps of “insert each of the pilot symbol sequences at the same temporal point in each modulation signal ..., wherein the pilot symbol sequences are orthogonal to each other.” *Id.*, claim 9.

187. The ’005 patent describes a specific problem to be solved in multiplexing modulation signals to be sent from a plurality of antennas and its claims are directed to specific ways of solving that problem. That solution is further implemented in the claims, including claim

9. Therefore, the claims of '005 patent are patent eligible. In addition, the claims of the '005 Patent are directed to solving problems that solely arise in computer technology (digital signal communication and transmission) via a specific improvement to its operation. For example, the claims are directed to a specific improvement in wireless systems as to multiplexing modulation signals of a plurality of channels to the same frequency band. As such, they are not patent ineligible abstract ideas.

188. The claims also survive step two of Alice because they recite an inventive concept that provides features that are more than well-understood, routine, conventional activity. *See e.g.*, '005 patent, claim 9, 1:56-67, 2:12-24, 2:31-37.

189. At a minimum, Broadcom, Inc. and Broadcom Corporation have known of the '005 patent at least as early as the filing date of the Complaint. In addition, Broadcom, Inc. and Broadcom Corporation have known about the '005 patent since at least November 2021, when Broadcom, Inc. and Broadcom Corporation received notice of the '005 patent via a letter sent by Redwood on November 3, 2021. Redwood sent several follow-up letters to Broadcom, including letters sent on January 4, 2022 and March 2, 2022. In May 2022, Broadcom, Inc. and Broadcom Corporation received further notice of their infringement of the '005 patent when Redwood sent a second letter providing notice of their infringement on May 12, 2022. Redwood again sent a follow-up letter to Broadcom, Inc. and Broadcom Corporation on September 13, 2022 and two follow-up letters to Broadcom, Inc. and Broadcom Corporation on September 14, 2022. On September 19, 2022, Broadcom, Inc. and Broadcom Corporation finally replied to Redwood via e-mail, where Redwood provided Broadcom, Inc. and Broadcom Corporation access to its data room for the infringement chart of the '005 patent, where Broadcom, Inc. and Broadcom Corporation were provided further notice of their infringement. Based on information and belief,

Broadcom, Inc was on notice of the '005 patent from at least the foregoing dates that Broadcom Corporation was on notice of the '005 patent as a result of receiving actual or constructive notice from Broadcom Corporation, which is owned and controlled by its parent Broadcom, Inc.<sup>12</sup> Furthermore, Broadcom Corporation was on notice of the '005 patent from at least the foregoing dates that Broadcom, Inc. was on notice of the '005 patent as a result of receiving actual or constructive notice from Broadcom, Inc., which wholly owns and controls Broadcom Corporation, which is an agent and alter ego of Broadcom, Inc.<sup>13</sup>

190. On information and belief, since at least the above-mentioned dates when Broadcom was on notice of its infringement, Broadcom has actively induced, under U.S.C. § 271(b), distributors, customers, subsidiaries, importers, partners, affiliates, resellers, manufacturers, end users, and/or consumers to directly infringe one or more claims of the '005 patent by making, using, offering for sale, selling, and/or importing the Accused Products. Since at least the notice provided on the above-mentioned dates, Broadcom does so with knowledge, or with willful blindness of the fact, that the induced acts constitute infringement of the '005 patent. Broadcom intends to cause, and has taken affirmative steps to induce infringement by distributors, customers, subsidiaries, importers, partners, affiliates, resellers, manufacturers, end users, and/or consumers by at least, inter alia, creating advertisements that promote the infringing use of the Accused Products, creating and/or maintaining and/or knowledge of established distribution channels for the Accused Products into and within the United States, manufacturing the Accused Products in conformity with U.S. laws and regulations, manufacturing the Accused Products in conformity with the relevant IEEE 802.11 standards, distributing or making available instructions or manuals for the Accused Products to purchasers and prospective buyers, providing the accused

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<sup>12</sup> See FN 2, *supra*.

<sup>13</sup> See FN 2, *supra*.

functionalities via hardware, software, and/or firmware that are included in the Accused Products to manufacturers, purchasers, sellers, distributors, and/or end users, testing and certifying features related to infringing features in the Accused Products, and/or providing technical support, replacement parts, or services for these products to these purchasers and/or sellers in the United States.

191. On information and belief, despite having knowledge of the '005 patent and their infringement, Defendants specifically intended for others to import and sell products accused of infringing the '005 patent. For example, Defendants specifically intended for its U.S.-based subsidiaries or customers to import and sell products accused of infringing the '005 patent. On information and belief, Defendants instructed and encouraged the importers to import and/or sell products accused of infringing the '005 patent. On information and belief, the purchase and sale agreements between Broadcom, Inc., Broadcom Corporation, and the importers provide such instruction and/or encouragement. Further, on information and belief, Defendants' U.S.-based subsidiaries, affiliates, employees, agents, and/or related companies existed for inter alia, the purpose of importing and selling products accused of infringing the '005 patent in the United States.

192. On information and belief, since at least the above-mentioned dates when Broadcom was on notice of its infringement, Broadcom's contributory infringement pursuant to 35 U.S.C. § 271(c) includes offering to sell and/or license, selling and/or licensing, and/or providing within the United States, or importing into the United States, components of the patented invention of one or more claims of the '005 patent, constituting a material part of the invention. On information and belief, Broadcom knows and has known the same to be especially made or especially adapted for use in an infringement of the '005 patent by making the Accused Products

in conformity with the relevant IEEE 802.11 standards, and such components are not a staple article or commodity of commerce suitable for substantial noninfringing use. For example, Broadcom offers to sell, sells, and/or licenses or otherwise provides hardware and/or software/firmware components of the Accused Products within the United States; the components constitute a material part of the claimed inventions of the '005 patent that are especially made or especially adapted for use in end user products that infringe the '005 patent; and the components are not a staple article or commodity of commerce suitable for substantial noninfringing use.

193. On information and belief, since at least the above-mentioned dates when Broadcom was on notice of its infringement, Broadcom's infringement pursuant to 35 U.S.C. § 271(f)(1) includes supplying or causing to be supplied in or from the United States all or a substantial portion of the components of the patented invention of one or more claims of the '005 patent, where such components are uncombined in whole or in part, in such manner as to actively induce the combination of such components outside of the United States in a manner that would infringe the patent if such combination occurred within the United States. For example, Broadcom supplies or causes to be supplied in or from the United States the hardware and/or software/firmware components of the Accused Products that comprise all or a substantial portion of the components of the patented inventions of the '005 patent, where Broadcom actively induces the combination of such components outside of the United States in a manner that would infringe the patent if such combination occurred within the United States. In another example, Broadcom supplies or causes to be supplied in or from the United States the hardware and/or software/firmware components of the Accused Products that comprise all or a substantial portion of the components of the patented inventions of the '005 patent, where Broadcom actively induces the combination of the hardware and/or software/firmware components with other components of



an end user device outside of the United States in a manner that would infringe the patent if such combination occurred within the United States. Broadcom intends to cause, and has taken affirmative steps to induce infringement by distributors, customers, subsidiaries, importers, partners, affiliates, resellers, manufacturers, and/or consumers by at least, inter alia, creating advertisements that promote the infringing use of the Accused Products, creating and/or maintaining and/or knowledge of established distribution channels for the Accused Products into and within the United States, manufacturing the components of the Accused Products in conformity with U.S. laws and regulations, manufacturing the components of the Accused Products in conformity with the relevant IEEE 802.11 standards, distributing or making available instructions or manuals or marketing materials regarding the combination of the hardware and software/firmware components, distributing or making available instructions or manuals or marketing materials regarding the combination of the hardware and/or software/firmware components with other components as part of making an end user device in part or in whole, testing and certifying features related to infringing features in the Accused Products, providing software and/or firmware for the Accused Products to manufacturers, purchasers, sellers, distributors, and/or end users, and/or providing technical support, replacement parts, or services for these products to these purchasers and/or sellers in the United States.

194. On information and belief, since at least the above-mentioned dates when Broadcom was on notice of its infringement, Broadcom's infringement pursuant to 35 U.S.C. § 271(f)(2) includes supplying or causing to be supplied in or from the United States components of the patented invention of one or more claims of the '005 patent that are especially made or especially adapted for use in the invention and not staple articles or commodities of commerce suitable for substantial noninfringing use, where such components are uncombined in whole or in

part, knowing that such components are so made or adapted and intending that such components will be combined outside of the United States in a manner that would infringe the patent if such combination occurred within the United States. For example, Broadcom supplies or causes to be supplied in or from the United States the hardware and/or software/firmware components that comprise all or a substantial portion of the components of the patented inventions of the '005 patent, where such components are uncombined in whole or in part, knowing that such components are especially made or especially adapted for use in the invention and not staple articles or commodities of commerce suitable for substantial noninfringing use and intending that such components will be combined outside of the United States in a manner that would infringe the patent if such combination occurred within the United States. In another example, Broadcom supplies or causes to be supplied in or from the United States the hardware and/or software/firmware components that comprise all or a substantial portion of the components of the patented inventions of the '005 patent, where such components are uncombined in whole or in part with other components of an end user device, knowing that such components are especially made or especially adapted for use in the invention and not staple articles or commodities of commerce suitable for substantial noninfringing use and intending that such components will be combined with other components of an end user device outside of the United States in a manner that would infringe the patent if such combination occurred within the United States.

195. On information and belief, despite having knowledge of the '005 patent and knowledge that it is directly and/or indirectly infringing one or more claims of the '005 patent, Broadcom has nevertheless continued its infringing conduct and disregarded an objectively high likelihood of infringement. Broadcom's infringing activities relative to the '005 patent have been, and continue to be, willful, wanton, malicious, in bad-faith, deliberate, consciously wrongful,

flagrant, characteristic of a pirate, and an egregious case of misconduct beyond typical infringement such that Plaintiff is entitled under 35 U.S.C. § 284 to enhanced damages up to three times the amount found or assessed.

196. Redwood has been damaged as a result of Broadcom's infringing conduct described in this Count. Broadcom is, thus, liable to Redwood in an amount that adequately compensates Redwood for Broadcom's infringements, which, by law, cannot be less than a reasonable royalty, together with interest and costs as fixed by this Court under 35 U.S.C. § 284.

## **COUNT VII**

(INFRINGEMENT OF U.S. PATENT NO. 8,873,517)

197. Plaintiff incorporates paragraphs 1 through 196 herein by reference.

198. Redwood is the assignee of the '517 patent, entitled "Wireless Communication System, Wireless Communication Apparatus, Wireless Communication Method and Computer Program," with ownership of all substantial rights in the '517 patent, including the right to exclude others and to enforce, sue, and recover damages for past and future infringements.

199. The '517 patent is valid, enforceable, and was duly issued in full compliance with Title 35 of the United States Code. The '517 patent issued from U.S. Patent Application No. 11/333,582.

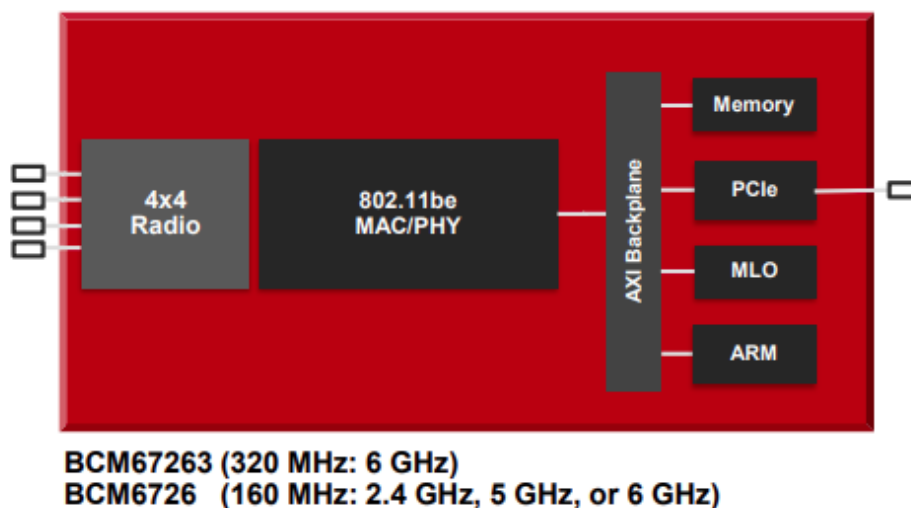
200. Broadcom has and continues to directly and/or indirectly infringe one or more claims of the '517 patent in this judicial district and elsewhere in Texas and the United States.

201. Broadcom directly infringes the '517 patent via 35 U.S.C. § 271(a) by making, using, offering for sale, selling, and/or importing the Accused Products, their components and processes, and/or products containing the same that incorporate the fundamental technologies covered by the '517 patent.

202. Furthermore, Broadcom, Inc. directly infringes the '517 patent through its direct involvement in the activities of its subsidiaries, including Broadcom Corporation. Such subsidiaries conduct activities that constitute direct infringement of the '517 patent under 35 U.S.C. § 271(a) by making, using, testing, offering for sale, selling, and/or importing those Accused Products, their components and processes, and/or products containing the same that incorporated the fundamental technologies covered by the '517 patent. Further, Defendants are vicariously liable for this infringing conduct of its subsidiaries (under both the alter ego and agency theories) because, as an example and on information and belief, Broadcom, Inc, Broadcom Corporation, and their subsidiaries and related companies are essentially the same company, and Broadcom Inc. and Broadcom Corporation have the right and ability to control their subsidiaries infringing acts and receive a direct financial benefit from the infringement of its subsidiaries. Furthermore, on information and belief, Broadcom sells and makes the Accused Products outside of the United States, delivers those products to manufacturers, customers, distributors, and/or subsidiaries in the United States, or in the case that it delivers the Accused Products outside of the United States it does so intending and/or knowing that those products or products that are manufactured to include Broadcom's Accused Products are destined for the United States and/or designing those products for inclusion in other products to be placed on sale and used in the United States, thereby directly infringing the '517 patent. *See, e.g., Lake Cherokee Hard Drive Techs., L.L.C. v. Marvell Semiconductor, Inc.*, 964 F. Supp. 2d 653, 658 (E.D. Tex. 2013).

203. For example, Broadcom infringes claim 1 of the '517 patent via the Accused Products, including the BCM6726 series. The Accused Products, including the BCM6726 series, are mesh stations that are mesh devices compliant with IEEE 802.11 in a wireless communication system using a signal described in IEEE 802.11. *See, e.g.,* Sections 14.3.2 and 14.13.2.1 of IEEE

802.11 2016; <https://www.broadcom.com/products/wireless/wireless-lan-infrastructure/bcm67263> (Broadcom advertising that the BCM6726 is MAC/PHY/radio device for Wi-Fi mesh); <https://docs.broadcom.com/doc/6726X-PB1XX>:



BCM67263 & BCM6726 Specifications	
Parameter	Details
Wi-Fi Standards	IEEE 802.11be (Wi-Fi 7) Release 1.0 compliant IEEE 802.11ax (Wi-Fi 6 & 6E) compliant IEEE 802.11 a/b/g/n/ac
Spatial Streams	Quad-stream 4x4
Spectral Bands	2.4 GHz 5 GHz 6 GHz

204. The Accused Products, including the BCM6726 series, each comprise circuitry configured to set a duration of transmission opportunity and an offset of the transmission opportunity indicating a beginning of the transmission opportunity with respect to a beginning of a transmission interval. For example, the Accused Products, including the BCM6726 series, comprise circuitry configured to set a duration of a transmission opportunity via a Mesh Awake Window, which specifies the duration of a transmission opportunity. *See, e.g.*, Figure 14-6 of IEEE 802.11 2016. The Accused Products comprise circuitry configured to perform a Target Beacon Transmission Time (“TBTT”) adjustment procedure, subtracting a delay amount as an offset from the TBTT, which indicates a beginning of the Mesh Awake Windows. *See, e.g.*, Section

14.13.4.4.3 and Figure 14-6 of IEEE 802.11 2016. The adjusted TBTT indicates a beginning of the Mesh Awake Window with respect to the beginning of a Beacon Interval. *See, e.g.*, Section 14.13.4.4.3 and Figure 14-6 of IEEE 802.11 2016.

205. The Accused Products, including the BCM6726 series, each comprise circuitry configured to transmit information specifying the duration and the offset to at least one or more other mesh stations. For example, the Accused Products are configured to transmit Mesh Beacons specifying the duration and the offset to at least one or more other mesh stations. *See, e.g.*, Sections 9.4.2.105, 14.13.4.2.5, 14.13.3.1, and 14.13.4.4.3 of IEEE 802.11 2016.

206. The Accused Products, including the BCM6726 series, each comprise circuitry configured to transmit or receive data during the transmission opportunity. For example, the Accused Products are configured to transmit or receive data during the Mesh Awake Window. *See, e.g.*, Section 14.14.4.7 and Figure 14-6 of IEEE 802.11 2016.

207. The specific ways in which the Accused Products, including the BCM6726 series, are configured to support the aforementioned features of IEEE 802.11 2016 are further detailed in confidential documents and/or source code that evidence infringement by the Accused Products as to at least Claim 1 of the '517 patent.

208. Furthermore, the Accused Products, including the BCM6726 series, are configured or implemented in an infringing manner with the features and functionality recited in at least Claim 1 of the '517 patent.

209. The technology discussion above and the exemplary Accused Products provide context for Plaintiff's infringement allegations.

210. The claims of the '517 patent are patent eligible under 35 U.S.C. § 101. The '517 patent is not directed to an ineligible abstract idea. For example, it is not a mathematical algorithm

executed on a generic computer or a fundamental economic business practice. Instead, the '517 patent describes a specific problem to be solved in signal transmission and communication, and its claims are directed to specific ways of solving that problem. The '517 patent is eligible because it is directed to a non-abstract improvement in an existing technological process. Indeed, the '517 patent is directed to improving the efficiency of a wireless network by setting durations and transmission opportunities to evade mutual interference among communication stations within a mesh network. *See, e.g.*, '517 patent, 1:40-46) (the '517 patent enables a “communication station[s] to evade mutual interference”).

211. For example, the claims of the '517 patent provide a specific solution of evading mutual interference by setting durations and periodicities of transmission opportunities. As the '517 patent explains, these limitations effectively shift beacon transmission times away from each other to evade overlapping transmissions among communication stations, thus advancing the goal of evading interference. *See, e.g.*, '517 patent, 21:50-60 (“By providing the TBTT offset, actual beacon transmission times can be shifted from each other even in a case where two communication stations arrange their beacon transmission timing in the same slot on a super frame.”). Accordingly, claim 1 does not cover an abstract idea but instead covers a patentable improvement in signal transmission. *See, e.g., Id.*, claim 1 (“set a duration of transmission opportunity and an offset of the transmit opportunity indicating a beginning of the transmission opportunity with respect to a beginning of a transmission interval.”). In addition, the claims of the '517 patent are directed to solving problems, e.g., signal interference, that solely arise in computer technology (digital signal communication and transmission) via a specific improvement in its operation, e.g., shifting beacon transmission times away from each other to evade overlapping transmissions among communication stations. As such, they are not patent ineligible abstract ideas.

212. The claims of the '517 patent also survive step two of Alice because they recite an inventive concept that provides features that are more than well-understood, routine, conventional activity. As explained above, the claims shift beacon transmission times away from each other to evade overlapping transmissions among communication stations, thus advancing the goal of evading interference. The claims are directed to the technical solutions described in the specification. *See, e.g.*, '517 patent, claim 1, 1:40-46, 21:50-60.

213. At a minimum, Broadcom, Inc. and Broadcom Corporation have known of the '517 patent at least as early as the filing date of the Complaint. In addition, Broadcom, Inc. and Broadcom Corporation have known about the '517 patent since at least November 2021, when Broadcom, Inc. and Broadcom Corporation received notice of their infringement of the '517 patent via a letter sent by Redwood on November 3, 2021. Redwood sent several follow-up letters to Broadcom, including letters sent on January 4, 2022 and March 2, 2022. In May 2022, Broadcom, Inc. and Broadcom Corporation received further notice of their infringement of the '517 patent when Redwood sent a second letter providing notice of their infringement on May 12, 2022. Redwood again sent a follow-up letter to Broadcom, Inc. and Broadcom Corporation on September 13, 2022 and two follow-up letters to Broadcom, Inc. and Broadcom Corporation on September 14, 2022. On September 19, 2022, Broadcom, Inc. and Broadcom Corporation finally replied to Redwood via e-mail, where Redwood provided Broadcom, Inc. and Broadcom Corporation access to its data room for the infringement chart of the '517 patent, where Broadcom, Inc. and Broadcom Corporation were provided further notice of their infringement. In addition, Broadcom Corporation has had knowledge of the '517 patent based at least on its conduct before the United States Patent and Trademark Office. For example, the '517 patent was cited by the Examiner during the prosecution of the following patent documents assigned to Broadcom Corporation: U.S. Patent



No. 7,987,499B2. Based on information and belief, Broadcom, Inc was on notice of the '517 patent from at least the foregoing dates that Broadcom Corporation was on notice of the '517 patent as a result of receiving actual or constructive notice from Broadcom Corporation, which is owned and controlled by its parent Broadcom, Inc.<sup>14</sup> Furthermore, Broadcom Corporation was on notice of the '517 patent from at least the foregoing dates that Broadcom, Inc. was on notice of the '517 patent as a result of receiving actual or constructive notice from Broadcom, Inc., which wholly owns and controls Broadcom Corporation, which is an agent and alter ego of Broadcom, Inc.<sup>15</sup>

214. On information and belief, since at least the above-mentioned dates when Broadcom was on notice of its infringement, Broadcom has actively induced, under U.S.C. § 271(b), distributors, customers, subsidiaries, importers, partners, affiliates, resellers, manufacturers, end users, and/or consumers to directly infringe one or more claims of the '517 patent by making, using, offering for sale, selling, and/or importing the Accused Products. Since at least the notice provided on the above-mentioned dates, Broadcom does so with knowledge, or with willful blindness of the fact, that the induced acts constitute infringement of the '517 patent. Broadcom intends to cause, and has taken affirmative steps to induce infringement by distributors, customers, subsidiaries, importers, partners, affiliates, resellers, manufacturers, end users, and/or consumers by at least, inter alia, creating advertisements that promote the infringing use of the Accused Products, creating and/or maintaining and/or knowledge of established distribution channels for the Accused Products into and within the United States, manufacturing the Accused Products in conformity with U.S. laws and regulations, manufacturing the Accused Products in conformity with the relevant IEEE 802.11 standards, distributing or making available instructions or manuals for the Accused Products to purchasers and prospective buyers, providing the accused

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<sup>14</sup> See FN 2, *supra*.

<sup>15</sup> See FN 2, *supra*.

functionalities via hardware, software, and/or firmware that are included in the Accused Products to manufacturers, purchasers, sellers, distributors, and/or end users, testing and certifying features related to infringing features in the Accused Products, and/or providing technical support, replacement parts, or services for these products to these purchasers and/or sellers in the United States.

215. On information and belief, despite having knowledge of the '517 patent and their infringement, Defendants specifically intended for others to import and sell products accused of infringing the '517 patent. For example, Defendants specifically intended for its U.S.-based subsidiaries or customers to import and sell products accused of infringing the '517 patent. On information and belief, Defendants instructed and encouraged the importers to import and/or sell products accused of infringing the '517 patent. On information and belief, the purchase and sale agreements between Broadcom, Inc., Broadcom Corporation, and the importers provide such instruction and/or encouragement. Further, on information and belief, Defendants' U.S.-based subsidiaries, affiliates, employees, agents, and/or related companies existed for inter alia, the purpose of importing and selling products accused of infringing the '517 patent in the United States.

216. On information and belief, since at least the above-mentioned dates when Broadcom was on notice of its infringement, Broadcom's contributory infringement pursuant to 35 U.S.C. § 271(c) includes offering to sell and/or license, selling and/or licensing, and/or providing within the United States, or importing into the United States, components of the patented invention of one or more claims of the '517 patent, constituting a material part of the invention. On information and belief, Broadcom knows and has known the same to be especially made or especially adapted for use in an infringement of the '517 patent by making the Accused Products

in conformity with the relevant IEEE 802.11 standards, and such components are not a staple article or commodity of commerce suitable for substantial noninfringing use. For example, Broadcom offers to sell, sells, and/or licenses or otherwise provides hardware and/or software/firmware components of the Accused Products within the United States; the components constitute a material part of the claimed inventions of the '517 patent that are especially made or especially adapted for use in end user products that infringe the '517 patent; and the components are not a staple article or commodity of commerce suitable for substantial noninfringing use.

217. On information and belief, since at least the above-mentioned dates when Broadcom was on notice of its infringement, Broadcom's infringement pursuant to 35 U.S.C. § 271(f)(1) includes supplying or causing to be supplied in or from the United States all or a substantial portion of the components of the patented invention of one or more claims of the '517 patent, where such components are uncombined in whole or in part, in such manner as to actively induce the combination of such components outside of the United States in a manner that would infringe the patent if such combination occurred within the United States. For example, Broadcom supplies or causes to be supplied in or from the United States the hardware and/or software/firmware components of the Accused Products that comprise all or a substantial portion of the components of the patented inventions of the '517 patent, where Broadcom actively induces the combination of such components outside of the United States in a manner that would infringe the patent if such combination occurred within the United States. In another example, Broadcom supplies or causes to be supplied in or from the United States the hardware and/or software/firmware components of the Accused Products that comprise all or a substantial portion of the components of the patented inventions of the '517 patent, where Broadcom actively induces the combination of the hardware and/or software/firmware components with other components of

an end user device outside of the United States in a manner that would infringe the patent if such combination occurred within the United States. Broadcom intends to cause, and has taken affirmative steps to induce infringement by distributors, customers, subsidiaries, importers, partners, affiliates, resellers, manufacturers, and/or consumers by at least, inter alia, creating advertisements that promote the infringing use of the Accused Products, creating and/or maintaining and/or knowledge of established distribution channels for the Accused Products into and within the United States, manufacturing the components of the Accused Products in conformity with U.S. laws and regulations, manufacturing the components of the Accused Products in conformity with the relevant IEEE 802.11 standards, distributing or making available instructions or manuals or marketing materials regarding the combination of the hardware and software/firmware components, distributing or making available instructions or manuals or marketing materials regarding the combination of the hardware and/or software/firmware components with other components as part of making an end user device in part or in whole, testing and certifying features related to infringing features in the Accused Products, providing software and/or firmware for the Accused Products to manufacturers, purchasers, sellers, distributors, and/or end users, and/or providing technical support, replacement parts, or services for these products to these purchasers and/or sellers in the United States.

218. On information and belief, since at least the above-mentioned dates when Broadcom was on notice of its infringement, Broadcom's infringement pursuant to 35 U.S.C. § 271(f)(2) includes supplying or causing to be supplied in or from the United States components of the patented invention of one or more claims of the '517 patent that are especially made or especially adapted for use in the invention and not staple articles or commodities of commerce suitable for substantial noninfringing use, where such components are uncombined in whole or in

part, knowing that such components are so made or adapted and intending that such components will be combined outside of the United States in a manner that would infringe the patent if such combination occurred within the United States. For example, Broadcom supplies or causes to be supplied in or from the United States the hardware and/or software/firmware components that comprise all or a substantial portion of the components of the '517 patent, where such components are uncombined in whole or in part, knowing that such components are especially made or especially adapted for use in the invention and not staple articles or commodities of commerce suitable for substantial noninfringing use and intending that such components will be combined outside of the United States in a manner that would infringe the patent if such combination occurred within the United States. In another example, Broadcom supplies or causes to be supplied in or from the United States the hardware and/or software/firmware components that comprise all or a substantial portion of the components of the patented inventions of the '517 patent, where such components are uncombined in whole or in part with other components of an end user device, knowing that such components are especially made or especially adapted for use in the invention and not staple articles or commodities of commerce suitable for substantial noninfringing use and intending that such components will be combined with other components of an end user device outside of the United States in a manner that would infringe the patent if such combination occurred within the United States.

219. On information and belief, despite having knowledge of the '517 patent and knowledge that it is directly and/or indirectly infringing one or more claims of the '517 patent, Broadcom has nevertheless continued its infringing conduct and disregarded an objectively high likelihood of infringement. Broadcom's infringing activities relative to the '517 patent have been, and continue to be, willful, wanton, malicious, in bad-faith, deliberate, consciously wrongful,

flagrant, characteristic of a pirate, and an egregious case of misconduct beyond typical infringement such that Plaintiff is entitled under 35 U.S.C. § 284 to enhanced damages up to three times the amount found or assessed.

220. Redwood has been damaged as a result of Broadcom's infringing conduct described in this Count. Broadcom is, thus, liable to Redwood in an amount that adequately compensates Redwood for Broadcom's infringements, which, by law, cannot be less than a reasonable royalty, together with interest and costs as fixed by this Court under 35 U.S.C. § 284.

### **COUNT VIII**

(INFRINGEMENT OF U.S. PATENT NO. 9,628,300)

221. Plaintiff incorporates paragraphs 1 through 220 herein by reference.

222. Redwood is the assignee of the '300 patent, entitled "Method and Signal Generating Apparatus for Generating Modulation Signals" with ownership of all substantial rights in the '300 patent, including the right to exclude others and to enforce, sue, and recover damages for past and future infringements.

223. The '300 patent is valid, enforceable, and was duly issued in full compliance with Title 35 of the United States Code. The '300 patent issued from U.S. Patent Application No. 14/591,346.

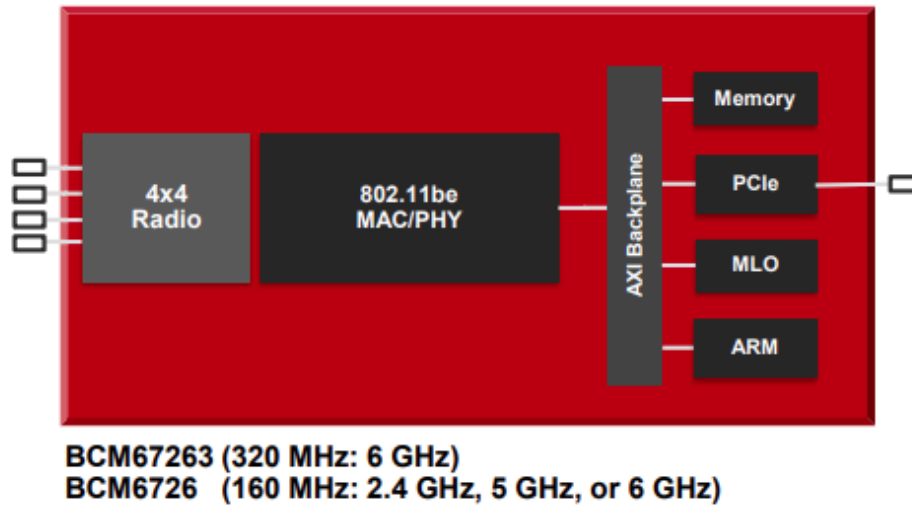
224. Broadcom has and continues to directly and/or indirectly infringe one or more claims of the '300 patent in this judicial district and elsewhere in Texas and the United States.

225. Broadcom directly infringes the '300 patent via 35 U.S.C. § 271(a) by making, using, offering for sale, selling, and/or importing the Accused Products, their components and processes, and/or products containing the same that incorporate the fundamental technologies covered by the '300 patent.

226. Furthermore, Broadcom, Inc. directly infringes the '300 patent through its direct involvement in the activities of its subsidiaries, including Broadcom Corporation. Such subsidiaries conduct activities that constitute direct infringement of the '300 patent under 35 U.S.C. § 271(a) by making, using, testing, offering for sale, selling, and/or importing those Accused Products, their components and processes, and/or products containing the same that incorporated the fundamental technologies covered by the '300 patent. Further, Defendants are vicariously liable for this infringing conduct of its subsidiaries (under both the alter ego and agency theories) because, as an example and on information and belief, Broadcom, Inc, Broadcom Corporation, and their subsidiaries and related companies are essentially the same company, and Broadcom Inc. and Broadcom Corporation have the right and ability to control their subsidiaries infringing acts and receive a direct financial benefit from the infringement of its subsidiaries. Furthermore, on information and belief, Broadcom sells and makes the Accused Products outside of the United States, delivers those products to manufacturers, customers, distributors, and/or subsidiaries in the United States, or in the case that it delivers the Accused Products outside of the United States it does so intending and/or knowing that those products or products that are manufactured to include Broadcom's Accused Products are destined for the United States and/or designing those products for inclusion in other products to be placed on sale and used in the United States, thereby directly infringing the '300 patent. *See, e.g., Lake Cherokee Hard Drive Techs., L.L.C. v. Marvell Semiconductor, Inc.*, 964 F. Supp. 2d 653, 658 (E.D. Tex. 2013).

227. For example, Broadcom infringes claim 8 of the '300 patent via the Accused Products, including the BCM6726 series. Each of the Accused Products are a signal generation apparatus configured to generate signals. *See, e.g.,* Sections 19.1.1 and 19.1.2 of IEEE 802.11 2016; <https://www.broadcom.com/products/wireless/wireless-lan-infrastructure/bcm67263>

(Broadcom advertising that the BCM6726 is MAC/PHY/radio device);  
<https://docs.broadcom.com/doc/6726X-PB1XX>:



BCM67263 & BCM6726 Specifications	
Parameter	Details
Wi-Fi Standards	IEEE 802.11be (Wi-Fi 7) Release 1.0 compliant IEEE 802.11ax (Wi-Fi 6 & 6E) compliant IEEE 802.11 a/b/g/n/ac
Spatial Streams	Quad-stream 4x4
Spectral Bands	2.4 GHz 5 GHz 6 GHz

228. The Accused Products, including the BCM6726 series, each comprise one or more processing devices configured to generate a plurality of modulation signals each of which is to be transmitted from a different one of a plurality of antennas. For example, each of the Accused Products generate modulation signals (e.g., HT-mixed format PPDU) which are to be transmitted from a plurality of antennas. *See, e.g.*, Section 9.3.3 of IEEE 802.11 2016. Each modulation signal includes a pilot symbol sequence and/or a pilot subcarrier including a plurality of pilot symbols used for demodulation. For example, each OFDM symbol within a modulation signal includes a pilot symbol sequence, in a 20 MHz transmission, of four pilot symbols located at carrier positions -21, -7, 7, and 21, or a pilot symbol sequence, in a 40 MHz transmission, of six pilot symbols,



where the pilot symbols are used for demodulation for detecting frequency offsets and phase noise. *See, e.g.*, Sections 17.3.5.9, 19.3.11.10, and Equation 19-54 of IEEE 802.11 2016.

229. Each of the Accused Products comprise one or more processing devices configured to insert each of the pilot symbol sequences and/or pilot subcarriers at a same temporal point in each modulation signal. For example, each of the modulation signals is comprised of pilot symbol sequences that include at least four pilot symbols inserted in, for example, carrier positions -21, -7, 7, and 21, such that each modulation signal and respective pilot symbol sequence are inserted and transmitted simultaneously in time. *See, e.g.*, Section 19.3.11.10 of IEEE 802.11 2016. The pilot symbol sequences and/or pilot subcarriers are orthogonal to each other, where each pilot symbol has a non-zero amplitude. For example, the pilot sequences corresponding to different spatial streams are orthogonal to each other and have zero mutual correlation. *See, e.g.*, Table 19-19 of IEEE 802.11 2016. A quantity of the plurality of pilot symbols in each pilot symbol sequence and/or pilot subcarrier are greater than a quantity of the plurality of modulation signals to be transmitted. As previously discussed, each pilot symbol sequence contains at least four pilot symbols in a 20 MHz transmission and at least six pilot symbols in a 40 MHz transmission, such that these quantities are greater than a respective number of modulation signals to be transmitted by the Accused Products. *See, e.g.*, Sections 19.1.1, 19.3.11.10 and Equation 19-54 of IEEE 802.11 2016.

230. Each of the Accused Products comprise one or more processing devices configured to output the plurality of modulation signals, each including different transmission data and one of the pilot symbol sequences and/or pilot subcarriers, to the plurality of antennas. For example, each of the modulation signals is transmitted to at least two antennas, such that each of the modulation

signals include different transmission data. *See, e.g.*, Section 19.3.15.1, Tables 19-28, 19-29, and 19-30, and Figure 17-13 of IEEE 802.11 2016.

231. As previously discussed, each of the plurality of modulation signals contains one of the pilot symbol sequences and/or pilot subcarriers. *See, e.g.*, Section 19.3.11.10 of IEEE 802.11 2016.

232. Furthermore, the Accused Products are configured or implemented in an infringing manner with the features and functionality recited in at least claim 8 of the '300 patent.

233. The specific ways in which the Accused Products are configured to support the aforementioned features of IEEE 802.11n and/or IEEE 802.11ac and/or IEEE 802.11ax and/or IEEE 802.11be are further detailed in confidential documents and/or source code that evidence infringement by the Accused Products as to at least claim 8 of the '300 patent.

234. The technology discussion above and the exemplary Accused Products provide context for Plaintiff's infringement allegations.

235. The claims of the '300 patent are patent eligible under 35 U.S.C. § 101. The '300 patent is not directed to an ineligible abstract idea. For example, it is not a mathematical algorithm executed on a generic computer or a fundamental economic business practice. Instead, the '300 patent describes a specific problem to be solved in digital signal transmission and communication involving multiplexing modulation signals of a plurality of channels and its claims are directed to specific ways of solving that problem. '300 patent, 1:26-29. The patent describes that "the foregoing conventional structure gives no thought to the synchronization between channels in the same frequency band as well as a frequency offset. As a result, this structure encounters the difficulty of achieving the most important factor in order to demultiplex a multiplexed signal, namely, obtaining an accuracy of estimating channels." *Id.* at 1:56-62. "The present invention aims

to provide a transmission method for estimating channels accurately and with ease from multiplexed modulation signals.” *Id.* at 1:66-2:1.

236. To overcome the aforementioned problems, the ’300 patent and its claims describe specific solutions for transmitting multiplexed communications. “The transmission method of the present invention transmits modulation signals of a plurality of channels available in the same frequency band from a plurality of antennas. A symbol used for demodulation is inserted in a given channel at a certain time, while in another channel symbol at the time, the same phase and quadrature signals in the in-phase quadrature plane are made to be zero signals. With this method, multiplexing the modulation signals of a plurality of channels to the same frequency allows increasing a data transmission rate. Because the symbol used for demodulation has not undergone the time multiplexing, so that the demodulation symbol can be isolated with ease at the reception apparatus.” *Id.*, 2:14-27. Claim 8 recites that “each pilot symbol ha[s] a non-zero amplitude.”

237. The ’300 patent and its claims describe another specific solution to overcome the aforementioned problems. “The transmission method of the present invention places the symbols used for demodulation at an identical time of the respective channels and orthogonally to each other. This preparation, i.e., the symbols used for demodulation are placed to be orthogonal to each other, allows the reception apparatus to isolate the symbols with ease for estimating channels.” *Id.*, 2:34-40. This additional solution is recited by claim 8, where the one or more processing devices are configured to “insert each of the pilot symbol sequences and/or pilot subcarriers at a same temporal point in each modulation signal ..., wherein the pilot symbol sequences and/or pilot subcarriers are orthogonal to each other.” *Id.*, claim 1.

238. The ’300 patent describes a specific problem to be solved in multiplexing modulation signals to be transmitted from a plurality of antennas and its claims are directed to

specific ways of solving that problem. That solution is further implemented in the claims, including claim 8. Therefore, the claims of '300 patent are patent eligible. In addition, the claims of the '300 patent are directed to solving problems that solely arise in computer technology (digital signal communication and transmission) via a specific improvement to its operation. For example, the claims are directed to a specific improvement in wireless systems as to multiplexing modulation signals of a plurality of channels to the same frequency band. As such, they are not patent ineligible abstract ideas.

239. The claims also survive step two of Alice because they recite an inventive concept that provides features that are more than well-understood, routine, conventional activity. *See e.g.*, '300 patent, claim 8, 1:56-2:1, 2:14-27, 2:34-40.

240. At a minimum, Broadcom, Inc. and Broadcom Corporation have known of the '300 patent at least as early as the filing date of the Complaint. In addition, Broadcom, Inc. and Broadcom Corporation have known about the '300 patent since at least November 2021, when Broadcom, Inc. and Broadcom Corporation received notice of the '300 patent via a letter sent by Redwood on November 3, 2021. Redwood sent several follow-up letters to Broadcom, including letters sent on January 4, 2022 and March 2, 2022. In May 2022, Broadcom, Inc. and Broadcom Corporation received further notice of their infringement of the '300 patent when Redwood sent a second letter providing notice of their infringement on May 12, 2022. Redwood again sent a follow-up letter to Broadcom, Inc. and Broadcom Corporation on September 13, 2022 and two follow-up letters to Broadcom, Inc. and Broadcom Corporation on September 14, 2022. On September 19, 2022, Broadcom, Inc. and Broadcom Corporation finally replied to Redwood via e-mail, where Redwood provided Broadcom, Inc. and Broadcom Corporation access to its data room for the infringement chart of the '300 patent, where Broadcom, Inc. and Broadcom

Corporation were provided further notice of their infringement. Based on information and belief, Broadcom, Inc was on notice of the '300 patent from at least the foregoing dates that Broadcom Corporation was on notice of the '300 patent as a result of receiving actual or constructive notice from Broadcom Corporation, which is owned and controlled by its parent Broadcom, Inc.<sup>16</sup> Furthermore, Broadcom Corporation was on notice of the '300 patent from at least the foregoing dates that Broadcom, Inc. was on notice of the '300 patent as a result of receiving actual or constructive notice from Broadcom, Inc., which wholly owns and controls Broadcom Corporation, which is an agent and alter ego of Broadcom, Inc.<sup>17</sup>

241. On information and belief, since at least the above-mentioned dates when Broadcom was on notice of its infringement, Broadcom has actively induced, under U.S.C. § 271(b), distributors, customers, subsidiaries, importers, partners, affiliates, resellers, manufacturers, end users, and/or consumers to directly infringe one or more claims of the '300 patent by making, using, offering for sale, selling, and/or importing the Accused Products. Since at least the notice provided on the above-mentioned dates, Broadcom does so with knowledge, or with willful blindness of the fact, that the induced acts constitute infringement of the '300 patent. Broadcom intends to cause, and has taken affirmative steps to induce infringement by distributors, customers, subsidiaries, importers, partners, affiliates, resellers, manufacturers, end users, and/or consumers by at least, inter alia, creating advertisements that promote the infringing use of the Accused Products, creating and/or maintaining and/or knowledge of established distribution channels for the Accused Products into and within the United States, manufacturing the Accused Products in conformity with U.S. laws and regulations, manufacturing the Accused Products in conformity with the relevant IEEE 802.11 standards, distributing or making available instructions

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<sup>16</sup> See FN 2, *supra*.

<sup>17</sup> See FN 2, *supra*.

or manuals for the Accused Products to purchasers and prospective buyers, providing the accused functionalities via hardware, software, and/or firmware that are included in the Accused Products to manufacturers, purchasers, sellers, distributors, and/or end users, testing and certifying features related to infringing features in the Accused Products, and/or providing technical support, replacement parts, or services for these products to these purchasers and/or sellers in the United States.

242. On information and belief, despite having knowledge of the '300 patent and their infringement, Defendants specifically intended for others to import and sell products accused of infringing the '300 patent. For example, Defendants specifically intended for its U.S.-based subsidiaries or customers to import and sell products accused of infringing the '300 patent. On information and belief, Defendants instructed and encouraged the importers to import and/or sell products accused of infringing the '300 patent. On information and belief, the purchase and sale agreements between Broadcom, Inc., Broadcom Corporation, and the importers provide such instruction and/or encouragement. Further, on information and belief, Defendants' U.S.-based subsidiaries, affiliates, employees, agents, and/or related companies existed for inter alia, the purpose of importing and selling products accused of infringing the '300 patent in the United States.

243. On information and belief, since at least the above-mentioned dates when Broadcom was on notice of its infringement, Broadcom's contributory infringement pursuant to 35 U.S.C. § 271(c) includes offering to sell and/or license, selling and/or licensing, and/or providing within the United States, or importing into the United States, components of the patented invention of one or more claims of the '300 patent, constituting a material part of the invention. On information and belief, Broadcom knows and has known the same to be especially made or

especially adapted for use in an infringement of the '300 patent by making the Accused Products in conformity with the relevant IEEE 802.11 standards, and such components are not a staple article or commodity of commerce suitable for substantial noninfringing use. For example, Broadcom offers to sell, sells, and/or licenses or otherwise provides hardware and/or software/firmware components of the Accused Products within the United States; the components constitute a material part of the claimed inventions of the '300 patent that are especially made or especially adapted for use in end user products that infringe the '300 patent; and the components are not a staple article or commodity of commerce suitable for substantial noninfringing use.

244. On information and belief, since at least the above-mentioned dates when Broadcom was on notice of its infringement, Broadcom's infringement pursuant to 35 U.S.C. § 271(f)(1) includes supplying or causing to be supplied in or from the United States all or a substantial portion of the components of the patented invention of one or more claims of the '300 patent, where such components are uncombined in whole or in part, in such manner as to actively induce the combination of such components outside of the United States in a manner that would infringe the patent if such combination occurred within the United States. For example, Broadcom supplies or causes to be supplied in or from the United States the hardware and/or software/firmware components of the Accused Products that comprise all or a substantial portion of the components of the patented inventions of the '300 patent, where Broadcom actively induces the combination of such components outside of the United States in a manner that would infringe the patent if such combination occurred within the United States. In another example, Broadcom supplies or causes to be supplied in or from the United States the hardware and/or software/firmware components of the Accused Products that comprise all or a substantial portion of the components of the patented inventions of the '300 patent, where Broadcom actively induces

the combination of the hardware and/or software/firmware components with other components of an end user device outside of the United States in a manner that would infringe the patent if such combination occurred within the United States. Broadcom intends to cause, and has taken affirmative steps to induce infringement by distributors, customers, subsidiaries, importers, partners, affiliates, resellers, manufacturers, and/or consumers by at least, inter alia, creating advertisements that promote the infringing use of the Accused Products, creating and/or maintaining and/or knowledge of established distribution channels for the Accused Products into and within the United States, manufacturing the components of the Accused Products in conformity with U.S. laws and regulations, manufacturing the components of the Accused Products in conformity with the relevant IEEE 802.11 standards, distributing or making available instructions or manuals or marketing materials regarding the combination of the hardware and software/firmware components, distributing or making available instructions or manuals or marketing materials regarding the combination of the hardware and/or software/firmware components with other components as part of making an end user device in part or in whole, testing and certifying features related to infringing features in the Accused Products, providing software and/or firmware for the Accused Products to manufacturers, purchasers, sellers, distributors, and/or end users, and/or providing technical support, replacement parts, or services for these products to these purchasers and/or sellers in the United States.

245. On information and belief, since at least the above-mentioned dates when Broadcom was on notice of its infringement, Broadcom's infringement pursuant to 35 U.S.C. § 271(f)(2) includes supplying or causing to be supplied in or from the United States components of the patented invention of one or more claims of the '300 patent that are especially made or especially adapted for use in the invention and not staple articles or commodities of commerce



suitable for substantial noninfringing use, where such components are uncombined in whole or in part, knowing that such components are so made or adapted and intending that such components will be combined outside of the United States in a manner that would infringe the patent if such combination occurred within the United States. For example, Broadcom supplies or causes to be supplied in or from the United States the hardware and/or software/firmware components that comprise all or a substantial portion of the components of the patented inventions of the '300 patent, where such components are uncombined in whole or in part, knowing that such components are especially made or especially adapted for use in the invention and not staple articles or commodities of commerce suitable for substantial noninfringing use and intending that such components will be combined outside of the United States in a manner that would infringe the patent if such combination occurred within the United States. In another example, Broadcom supplies or causes to be supplied in or from the United States the hardware and/or software/firmware components that comprise all or a substantial portion of the components of the patented inventions of the '300 patent, where such components are uncombined in whole or in part with other components of an end user device, knowing that such components are especially made or especially adapted for use in the invention and not staple articles or commodities of commerce suitable for substantial noninfringing use and intending that such components will be combined with other components of an end user device outside of the United States in a manner that would infringe the patent if such combination occurred within the United States.

246. On information and belief, despite having knowledge of the '300 patent and knowledge that it is directly and/or indirectly infringing one or more claims of the '300 patent, Broadcom has nevertheless continued its infringing conduct and disregarded an objectively high likelihood of infringement. Broadcom's infringing activities relative to the '300 patent have been,

and continue to be, willful, wanton, malicious, in bad-faith, deliberate, consciously wrongful, flagrant, characteristic of a pirate, and an egregious case of misconduct beyond typical infringement such that Plaintiff is entitled under 35 U.S.C. § 284 to enhanced damages up to three times the amount found or assessed.

247. Redwood has been damaged as a result of Broadcom's infringing conduct described in this Count. Broadcom is, thus, liable to Redwood in an amount that adequately compensates Redwood for Broadcom's infringements, which, by law, cannot be less than a reasonable royalty, together with interest and costs as fixed by this Court under 35 U.S.C. § 284.

### **CONCLUSION**

248. Plaintiff Redwood is entitled to recover from Broadcom the damages sustained by Plaintiff as a result of Broadcom's wrongful acts, and willful infringement, in an amount subject to proof at trial, which, by law, cannot be less than a reasonable royalty, together with interest and costs as fixed by this Court.

249. Plaintiff has incurred and will incur attorneys' fees, costs, and expenses in the prosecution of this action. The circumstances of this dispute may give rise to an exceptional case within the meaning of 35 U.S.C. § 285, and Plaintiff is entitled to recover its reasonable and necessary attorneys' fees, costs, and expenses.

### **JURY DEMAND**

250. Plaintiff hereby requests a trial by jury pursuant to Rule 38 of the Federal Rules of Civil Procedure.

### **PRAYER FOR RELIEF**

251. Plaintiff respectfully requests that the Court find in its favor and against Broadcom, and that the Court grant Plaintiff the following relief:

1. A judgment that Broadcom has infringed the Asserted Patents as alleged herein, directly and/or indirectly;
2. A judgment for an accounting of all damages sustained by Plaintiff as a result of the acts of infringement by Broadcom;
3. A judgment and order requiring Broadcom to pay Plaintiff damages under 35 U.S.C. § 284, including up to treble damages as provided by 35 U.S.C. § 284, and any royalties determined to be appropriate;
4. A judgment and order requiring Broadcom to pay Plaintiff pre-judgment and post-judgment interest on the damages awarded;
5. A judgment and order finding this to be an exceptional case and requiring Broadcom to pay the costs of this action (including all disbursements) and attorneys' fees as provided by 35 U.S.C. § 285; and
6. Such other and further relief as the Court deems just and equitable.

Dated: January 2, 2025

Respectfully submitted,

/s/ Patrick J. Conroy

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